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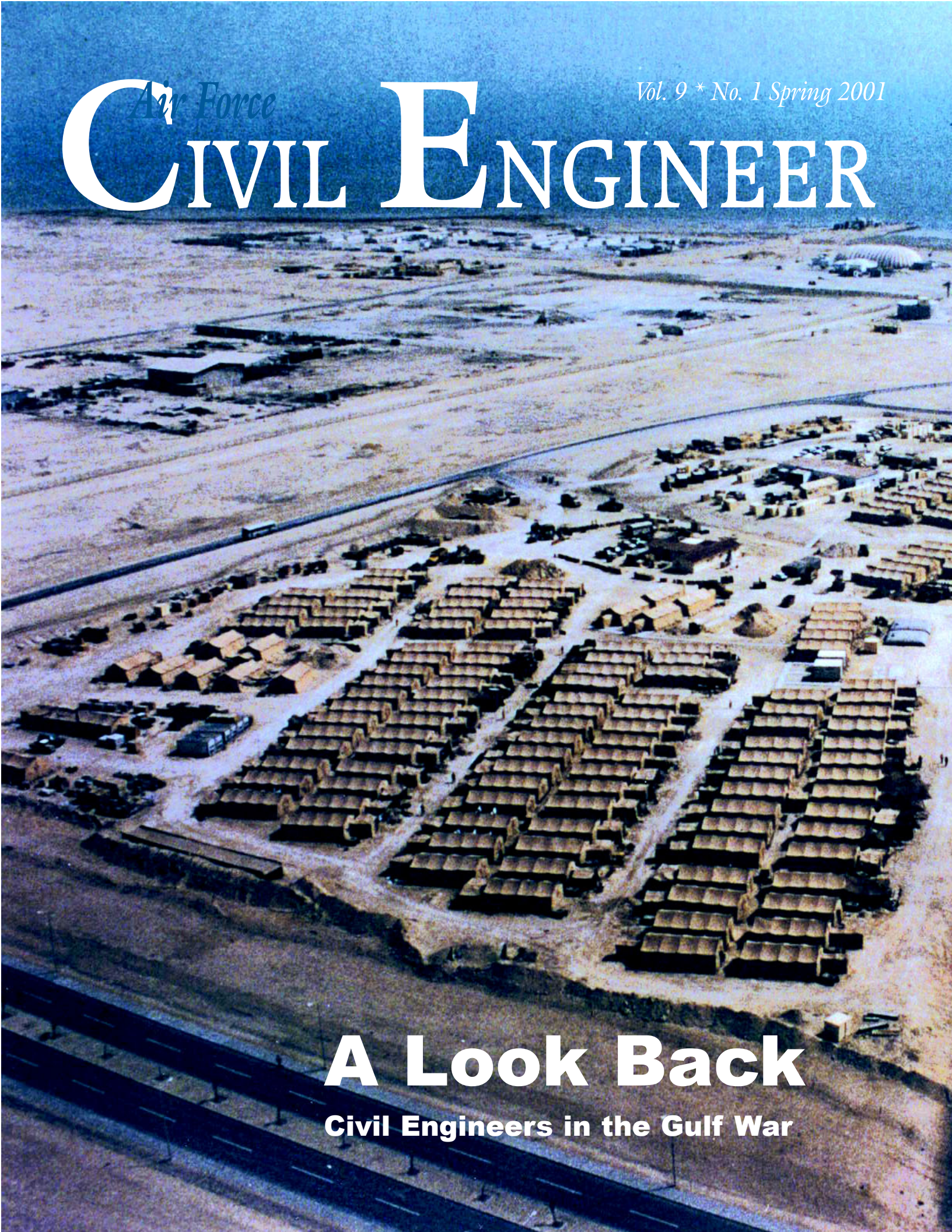

A Look Back

Civil Engineers in the Gulf War

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Maj Gen Earnest O. Robbins II

FROM THE TOP

"If there is one attitude more dangerous than to assume that a future war will be just like the last one, it is to imagine that it will be so utterly different that we can afford to ignore all the lessons of the last one."

— Former RAF Marshal, Sir John Slessor,
Air Power and Armies, 1936

Civil Engineering After the Gulf War: A New Focus

Air Force civil engineering has undergone many changes in the 10 years since the Gulf War. By the time the cease-fire was declared in February 1991, Prime BEEF and RED HORSE teams had provided crucial combat support at more than 25 sites in Southwest Asia, in addition to multiple sites in Europe and at locations stretching from England to Diego Garcia. While our mission was achieved with great success, it also generated some important lessons learned.

The Gulf War was a wakeup call for contingency training. When it began, many in CE had never trained on bare base equipment. Our "readiness" focus was on a Cold War scenario that concentrated our efforts on rapid runway repair and base recovery after attack. After Desert Storm, the focus of contingency training shifted dramatically, and since then we've made continuous improvements in both training and equipment. Our success today is linked to those investments.

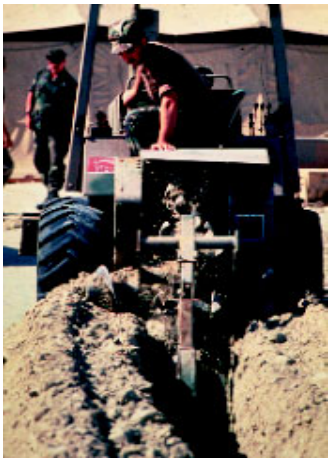
Our deployments continued to increase after the Gulf War. We left troops in Southwest Asia, then sent more to the Balkans. We executed support operations in Korea and Latin America. At the same time, the U.S. military reorganized and downsized. Our military engineer force dropped almost half in size. The increased pace in operations took a high toll on both those who deployed and those who covered the extra workload at home.

Our Cold War concepts were ill suited to the demands of smaller scale regional conflicts and peacekeeping operations. And so, the Expeditionary Aerospace Force (EAF) concept has evolved to allow the Air Force to adapt to its changing mission. The EAF is our direction for the 21st century — we must be extraordinarily "agile" while maintaining high-quality service at our home bases.

On this 10th anniversary of the Gulf War, the basics we require to be an expeditionary force are in place, and we are ready to adapt quickly to various deployments and contingencies. We deploy quickly and effectively, and we are ready to do the job when we get there — from building and sustaining bare bases to delivering humanitarian supplies.

Our transformation to the EAF has not come without growing pains, and we still have much to do before we have it "exactly right." However, I'm 100 percent confident that no matter what task might be levied on us, Air Force Civil Engineers are fully ready to provide commanders in the field the full spectrum of engineering support they need. History has shown that we are ready, we are agile, and we are very, very good!

Features



Also in this issue:

On the cover ...
Prime BEEF and RED HORSE troops bedded down Air Force operations at multiple sites in Southwest Asia prior to Operation DESERT STORM, including Shaikh Isa Air Base, Bahrain (pictured). Story page 7.

Departments

Please send story ideas, articles, photos, comments and suggestions to **cemag@tyndall.af.mil**

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Trained and Ready Airmen —
Fundamental to CE mission success

An interview with CMSgt Michael F. Doris, Chief of Enlisted Matters, Office of The Civil Engineer, Headquarters U.S. Air Force, Pentagon

The CE: From your travels around the major commands, how do you perceive morale to be among the troops?

Chief Doris: The morale of our civil engineers is generally good. I've found that our folks demonstrate their "Can do, Will do" attitudes daily.

There are valid concerns out there, the major ones being pay and entitlements; funding, in terms of having the resources available to do a job properly; and quality of life. There are a lot of variables involved, but we are actively working these at all levels of the Air Force.

For those out there with issues, we need to listen to and determine the validity of their concerns. If it's a matter that can be addressed at local levels, they should give their leadership a chance to work it; if it's an issue that needs to be addressed at higher levels, they should elevate it up their chain of command for the right people to work.

CMSgt Michael F. Doris

Unfortunately, there are those whom I call the "disgruntled employees." They have issues with everything and don't recognize when it's time to move on. We experienced this several years ago with reorganizing our squadrons and multi-skilling our specialties. There were many who resisted change, but fortunately we have overcome most of those issues and moved on to become productive in our restructured organizations and specialties.

The CE: According to the Air Force Personnel Center, over half of the enlisted force will be eligible to make a reenlistment decision between fiscal years 2001 and 2004, and with a robust economy the potential exists for large numbers to migrate to the private sector. How do CE's enlisted retention percentages compare to the Air Force's as a whole?

Chief Doris: Most of our AFSCs [Air Force Specialty Codes] are close to the Air Force averages. We do have a few that are dangerously low, but we have many folks working to make them better.

Fortunately, retention is being addressed at every level of Air Force senior leadership, up through the Chief of Staff. General [Michael E.] Ryan directed a Retention Summit in January 2000 that brought together experts on all types of personnel and compensation matters. As a result, there were a significant number of recommendations and initiatives developed to attack our retention challenges. Many of these are being implemented today, while others have been programmed over several years, to improve overall retention rates.

One of those initiatives establishes Career Advisor positions back at our wings. We should capitalize on this by establishing a CE liaison to the Career Advisor. Perhaps appointing a sharp, energetic, technical or master sergeant from within the CE organization as an additional duty, to relate to our folks specifically, might prove beneficial in assisting our personnel with their re-enlistment decisions and aiding our declining retention rates.

On a more immediate note, each of our CE AFSCs receives a first term, zone A, reenlistment bonus and 10 of our specialties receive a zone B bonus. We've also instituted a zone C bonus for four CE career fields. During the last selective reenlistment bonus review in January of this year, we requested increases to the bonus for 11 of the 13 CE specialties. Unfortunately, those increases did not receive funding so we'll re-evaluate our career fields this summer and try again, if needed.

We are also working to increase quality of life in our workplaces. So, we're addressing the retention issue from several different avenues.

The CE: What do you think keeps the young enlisted troops motivated to stay in CE, despite the current climate of privatization initiatives and base closures?

Chief Doris: Some of it is job satisfaction, learning the trades and being involved in every aspect of what goes on at an installation. We're probably the only functional area that impacts every single person at an installation on a daily basis. There aren't many others that can say that, and some of our folks recognize this.

I'd be naïve if I didn't say money has something to do with it — we're paying people to come in the Air Force and paying people to stay in the Air Force. But then there's the sense of pride and accomplishment that comes with learning a skill, learning a trade, going to work and getting something done so they can stand back and point to others and say, "I did that," and be proud.

We will always have a job for Air Force blue-suit civil engineers, in spite of competitive sourcing and privatiza-

tion, drawdowns, base closures, or whatever adverse actions people perceive are happening to our community. We're not giving a pink slip to any blue suit military civil engineer, and we're doing our very best to take care of our civilian work force at those locations that are affected.

The CE: In your opinion, how healthy are CE training programs?

Chief Doris: If I were a doctor, I would have to say that our training programs are in stable, but guarded, condition. Our squadron leadership supports training extremely well. The supervisors just need to capitalize on that support and execute their programs. At higher levels, there is considerable support for training, however quite often there is not funding.

We've just finished a complete round of Utilization and Training Workshops where we addressed training requirements for every civil engineer AFS. The review was led by career field managers at the Air Force Civil Engineer Support Agency with assistance from subject matter experts representing the major commands, plus the training development staff from our CE schools. It took about two years to complete. The CE schoolhouses and AFCESA's training division are now implementing the results. This will take some time because we can't get the resources overnight. For everything to come to fruition, we've got to source the instructor positions, the equipment items, and the student man-years to correctly size the courses and implement the curriculum.

Individually, our units are struggling to meet training requirements because of our operations tempo. Many folks aren't finding the time necessary to accomplish skills and contingency training requirements because they're working their backsides off maintaining our bases and meeting our AEF [Aerospace Expeditionary Force] deployment taskings, while being undermanned themselves. I attribute this to one of our Air Force core values, one that CE displayed long before the Air Force put it on a poster — Service Before Self. While other organizations on base may "close for training," CE rarely closes for anything.

The other thing I've discovered is there are those who don't know what all the training requirements are, or where they can find out. For example, some still don't know that AFQTPs [Air Force Qualification Training Packages] are *mandatory* for upgrade and often miss that essential training.

It's easy to find the requirements for every CE specialty because they are listed in the CFETPs [Career Field Education and Training Plans] and posted on the AFCESA web site. If our folks haven't visited that site, they're missing a great tool to help them do their jobs.

The CE: How does today's civil engineer training compare to that of 10 years ago, prior to Operations Desert Shield and Desert Storm?

Chief Doris: We've come a long way since Desert Shield and Desert Storm. Those who've been around since then can see a little of how things today are better and brighter.

When we first entered the Gulf War, a lot of people in CE had never seen or touched bare base equipment. We've since made major strides in exposing them to their wartime duties and equipment. A special thanks goes to the training programs at the CE schoolhouses, Silver Flag and the 49th Materiel Maintenance Group's mobile training teams for making this happen. We've also revised our home station training programs over the past decade. Today they are more focused and targeted toward specific skills for certain AFSCs. Our Silver Flag eligibility criteria reflects this fact by having those in critical UTC [unit type code] positions attend training.

The one thing we can do better, in my opinion, is capitalize on all the lessons learned from Desert Shield and Desert Storm. We've not always had the resources to implement new programs supporting those lessons in the past. Our future initiatives should follow our CE Core Competencies and be integrated within our CE Strategic Plan. All of our personnel should be familiar with the direction we're moving toward for 2025 so we aren't "relearning" those lessons. Our people need to know that there's a plan and we're going to do our best to follow it.

The CE: Utilities privatization initiatives could result in systems and equipment not being available for training. In that case, what alternatives are available to commanders to ensure their personnel can meet training requirements?

Chief Doris: First of all, utilities privatization will *not* result in lost opportunities for training our folks unless we let it. There are several different avenues that can be explored to meet training requirements at an installation when a system or piece of equipment is not available. We're in the process of updating the utilities privatization RFP [request for proposal] template that's been developed by AFCESA for use by the bases. This will allow for contracting some of the training in conjunction with the privatization measure.

As chief of enlisted matters for The Air Force Civil Engineer, Chief Doris advises Maj Gen Earnest O. Robbins on matters affecting CE's enlisted and wage grade civilian work force, especially readiness, morale, retention, training and work force utilization.

Specialty training locations run by Air Force Reserve Command and regional training sites run by the Air National Guard are available to provide some of this type of much-needed training. And there are other avenues to pursue as well, including local vocational or technical colleges and nearby military installations.

There is a *Commander's Procedural Guide* for obtaining training in support of utilities privatization that's been developed by AFCESA's training division and posted on the AFCESA web site. It offers great guidance on how commanders can execute their programs in light of the

privatization occurring at many of our bases. The key is to continually place emphasis on training.

The CE: Has meeting EAF obligations presented CE units with training challenges as well?

Chief Doris: The EAF [Expeditionary Aerospace Force]obligations and training requirements haven't changed. But we now have a specific reason for executing training programs in a timely fashion. Many of the installations could not execute, for whatever reason, some of their training at home station. In order to meet our EAF obligations, those training requirements must be sought out or accomplished sooner rather than later at other locations. We do a pretty good job of meeting our EAF obligations. At last count, about 90 percent of CE is obligated to the EAF. I would wager that's more than many other functional areas. I think we're also very effective at posturing and preparing our folks to meet our training requirements.

As I travel, I make it a point to speak with our enlisted personnel about their deployments and EAF commitments. Most of our personnel know what AEF "bucket" they're in and that's a big plus for the predictability and stability part of the concept.

All indications from the leadership at deployed locations reflect positive results; so our folks are also meeting the mission requirements. Additionally, those who remain behind at home station face challenges and high ops tempo as well, so it's important we remember both sides of the EAF equation.

The CE: How should CE training be postured over the next five years? What types of changes do you foresee?

Chief Doris chairs the AF Civil Engineer Chiefs' and Airmen's Councils. The councils review issues affecting the work force, communicate ideas, and develop recommendations for senior leadership consideration.

Chief Doris: A lot depends on influences outside our control, but in the next five years, CE training should be postured to capitalize on technology. We should see more use of the Internet, DVDs, electronic testing measures, and things of that nature. When the Air Force portal comes online we'll be better able to do this. Another consideration in implementing this is whether the programs that AFCESA and the Air Staff work are fully funded, including base-level funding.

For example, if we provide a DVD for training, will the unit have a DVD-capable computer? When we start talking about electronic testing in our career development courses or promotion testing, do the base and unit have the hardware to support that? I suspect that is funding the units and wings don't currently have to make this happen.

If I had a crystal ball, where would I see us going? This probably won't happen in the next five years, but eventually training will be accomplished electronically from any location. If we have people who are in training, or require training, when they deploy they will still be able to conduct their training from the middle of nowhere, electronically. And at home station, we will have the availability to provide training, or receive training, from locations in our workplace and where we reside, such as learning resource centers in the dormitories. We're getting there, but it's a slow process.

The CE: What other training issues are you currently working?

Chief Doris: The Chief of Staff has directed an initiative called "Developing Aerospace Leaders." There's a DAL office in the Pentagon, working for the Deputy Chief of Staff, Personnel, which we have a civil engineer officer assigned to. The DAL program started with looking at how we develop our officer corps. They've now expanded to the enlisted force, and they've hired a chief master sergeant to shepherd that effort. We in CE, through our CE Chiefs' Council, are the first support function actively involved in the DAL.

One of the things we're looking at is how we groom and grow our enlisted leadership to support our mission and requirements. We're looking all the way down to the staff sergeant level to determine what training and specific development a person needs to eventually become a chief master sergeant in CE.

We're also looking at how we employ our people, so that they will have the opportunity to become chiefs. As we become narrower at the top of the pyramid — master sergeant, senior master sergeant and ultimately chief master sergeant — we also narrow the types of positions in our objective CE squadrons that folks can aspire to fill. So if one wanted to become the chief of heavy repair, for example, there's only a select group of AFSCs that theoretically grow into that position. The same is true for the chief of infrastructure or other superintendent-level positions. So we're looking at opportunities for opening that up a little for our most qualified personnel.

The Chiefs' Council is also working to solve the disparity in the employment of our people, specifically in the 3E5 (engineering) and 3E6 (operations management) AFSCs. We want to expand the focus of how they are employed, so that their training and skills are used to most benefit them and the Air Force.

We're also looking at are improving our processes and the mechanisms by which training is made available, and improving quality of life standards, not just at home station but also in the deployed environment. We're looking at things like our overseas rotation index. For example, how much of a burden is it on our power production career field, which historically rotates back and forth overseas quite a bit. Through these types of initiatives, we want to influence our folks that CE is a good place to stick around, a good place to stay for the long haul.

Ten years ago Air Force civil engineers responded to the crisis in Southwest Asia as Iraq invaded and occupied Kuwait. Prime BEEF teams and RED HORSE squadrons provided crucial support to Operations Desert Shield/Desert Storm and made lasting contributions to stability and peace in the region, as reviewed in this

Gulf War Retrospective

by Lois Walker
HQ AFCESA Historian

Operation Desert Shield

Air Force civil engineers were one of the most important combat support elements deployed to the Middle East during Operation Desert Shield. They played a critical role in preparing and sustaining the network of air bases that supported the application of air power. Thanks to Air Force civil engineers, Lt Gen Charles A. Horner, commander of U.S. Central Command Air Forces (USCENTAF), could plan and direct the air campaign from multiple bases with confidence and flexibility.

Prime BEEF and RED HORSE troops performed beddown operations for 55,000 people and more than 1,500 aircraft at 25 sites throughout Southwest Asia (SWA). Overall, within seven months nearly 100 projects valued at $78 million were completed at U.S. deployment locations in SWA through troop or contract labor.

The pace of the deployment was fast. To meet the primary goal of deterring Iraqi aggression against Saudi Arabia, aircraft and crews deployed to the region first, and the support tail had to catch up. Engineers began deploying on August 7, 1990, some with little notice. Once on the ground, they scrambled to bring facilities on line as quickly as possible.

Their first tasks were to prepare runways, runway lighting and arresting barriers; establish fire protection and utilities; plan where facilities would be sited; and provide latrines. Next on the agenda was erecting living and working facilities, preparing ammunition storage areas, and erecting aircraft revetments, followed by environmental and sanitation concerns, facility hardening, and road construction.

Harvest Falcon equipment flowed in from prepositioning sites in the region. Engineers established additional supply lines through contracting officers dedicated to each base. Obtaining heavy construction equipment was a priority. Transportation was scarce during the deployment's first weeks, and much of the equipment that arrived from prepositioning sites was inoperable or soon broke down because seals and belts had dry-rotted in storage. The solution was to borrow or rent equipment from host nation engineers and heavy construction companies to grade areas for tent cities and carve out roads between living and working areas.

Desert Shield saw the first real-world use of Harvest Falcon assets, mobility basing sets developed in the 1980s that gave the Air Force the capability to deploy to bases and establish flying operations within 72 hours. This ambitious mobility concept presented unique problems and challenges to engineers, planners and developers. They developed a comprehensive *Bare Base Conceptual Planning Guide* to help formalize the new system and address how it would be employed.

Most engineers had never trained on the equipment because Harvest Falcon was a new program and training assets were not yet available. When TEMPER tents (Tent, Extendable, Modular, PERsonnel) and utility systems began appearing, many without Technical Orders, engineers were uncertain what constituted a complete set, how they were to be assembled, or how to repair the equipment. With ingenuity and flexibility, engineers quickly laid out the pieces, determined what went where, and began putting up tents. The first tent took about four hours to construct. Shortly thereafter, an experienced crew of four could assemble a four-section, 20x32-foot tent for 12 people in about an hour.

Harvest Falcon also used Harvest Bare structures such as Expandable Personnel Shelters with accordion-like walls that could be used as billets, office space, exchanges or storage areas. Expandable Shelter/Containers were erected as flightline shops, industrial shops and power plant control rooms. General Purpose shelters were hardwall structures designed to be aircraft engine shops and aircraft readiness spares storage areas, and also served as gymnasiums, clubs, warehouses and exchanges. One of the most interesting looking structures was the 125-foot Harvest Bare Aircraft Maintenance Hangar, known as a clamshell hangar due to its unique fabric-end closures. Members of the 4449th Mobility Support Squadron from Holloman Air Force Base, N.M., accompanied the hangars to help erect them.

The harsh environment made it nearly impossible to do heavy work during the day. Nighttime work shifts permitted troops to be as productive as possible while avoiding the midday heat, which often reached 120° F.

Electricity was critical to Air Force operations. A few sites had adequate commercial power, but generators were required at most. Initially, small 60 or 100kW low voltage mobile electric power (MEP) emergency

generators were used to power tent cities, aircraft maintenance shops and logistical areas. They were prone to failure from continuous use in the harsh environment and their roar was almost deafening to tent occupants. The solution was to install more efficient high-voltage MEP-12, 750kW generators and cables that allowed power plants to be placed greater distances from personnel cantonment areas.

Power delivery to end users required industrial-grade distribution equipment. The Air Force was in the midst of a transition from the contactor control cubicle (CCC) to the primary distribution center (PDC). Only three PDCs and no CCCs were available in SWA. In a matter of days, CEMIRT (Civil Engineering Maintenance, Inspection, and Repair Team) technicians designed a simple and reliable PDC using off-the-shelf components. They constructed 35 of them at Kelly AFB, Texas, and shipped them to waiting sites. CEMIRT also established a depot-level repair function in theater and provided hands-on electrical training for Prime BEEF troops.

Another critical issue was water — how to obtain it, purify it, distribute it and dispose of it. Water was trucked in and stored in rubber bladders. It was then chemically treated or processed through reverse osmosis water purification units (ROWPUs). Wastewater was distributed to underground storage tanks and pumped out by contractors or piped to a gray water pond. Where soil percolation conditions, together with stifling humidity levels, did not permit absorption, engineers constructed lagoon systems farther from cantonment areas to reduce health hazards. Entomology experts worked to minimize the spread of disease and reduce annoying insects and rodents.

Requirements at each base varied, but the work accomplished by the Prime BEEF team at King Fahd International Airport, Saudi Arabia, in the first month of the deployment was typical. The team laid more than 4,000 tons of asphalt for roads, parking, helicopter pads, dining halls and the air transportable hospital. They erected more than 370 tents; set up shower/shave units, latrines, potable water and electric distribution systems, and a camp revetment system; designed and installed a bunker system; provided wood floors for administrative and shop tents; and constructed a mall complex. They sectioned the base for bomb damage repair purposes and set up their own logistics operation to acquire scarce materials and tools.

At Riyadh, the Saudi government offered the use of Eskan Village, a housing compound originally built for the region's Bedouins (who preferred not to live there). Air Force engineers and contractors prepared the buildings for occupancy by cleaning up the complex, installing air conditioning and repairing broken pipes.

Firefighters provided crash-fire rescue and structural fire protection services to all Air Force sites in the region. They often integrated with host nation firefighters, sharing equipment and working areas. In-flight and ground emergencies kept them constantly busy, while the high number of patrol and training sorties generated thousands of hot refueling standbys.

In November, President Bush ordered additional forces (Phase II) to the Persian Gulf region to provide an offensive capability. This meant another push to bed down deploying forces. This time, however, engineers were already in place and prepared before aircraft and troops arrived. The presence of 823rd and 820th RED HORSE Squadron personnel in theater provided additional capability to undertake the major beddown tasks.

From October to March, a combined 435-person RED HORSE squadron was involved in more than 25 major projects, valued at more than $14.6 million. These included bedding down the largest air base in theater (in terms of number of aircraft) at Al Kharj Air Base, Saudi Arabia. They constructed aircraft hardstands and taxiways at Shaikh Isa AB, Bahrain; a theater munitions storage depot at Al Kharj; aircraft parking ramps at Al Minhad and Al Dhafra ABs, UAE; and integrated combat turn pads at King Khalid Military City. They also built an 800-person tent city, erected 29 K-span structures, placed more than 7 miles of paved roads at a U.S. Army ammunition supply point, and installed berms for Patriot anti-missile batteries and petroleum dikes.

Al Kharj, one of the sites selected to receive Phase II aircraft, was a classic bare base location. It had been programmed as a massive Saudi military installation, but only basic pavements had been constructed. RED HORSE, augmented by the 4th CES from Seymour Johnson AFB, N.C., and contract personnel, hauled 200,000 cubic yards of clay to build a foot-thick clay foundation for tent city. Eventually, they erected a tent city, set up four kitchens, an air transportable hospital, six K-span structures, and support facilities. They built munitions storage areas and bladder berms, completed utility distribution systems, and installed mobile aircraft arresting systems. The base was ready for aircraft in early January and by the beginning of the war was home to nearly 5,000 Air Force personnel.

Another RED HORSE team built a forward operating location 50 miles from the Iraqi border at King

Khalid Military City. Contract employees were prohibited from this site because of security concerns. Initially planned as an 800-person site with limited turn capability for flying missions, the base continued to expand until its population reached nearly 2,000 in February 1991.

In December 1990, CE forces from Europe began deploying to bases in Turkey as the coalition opened a second front to monitor and contain Iraq. Engineers planned and executed buildup of three bases for Joint Task Force Proven Force. At Incirlik they constructed "Tornado Town" and helped bed down deployed personnel. A 50-person Prime BEEF team from Bitburg AB, Germany, also deployed to Batman AB, Turkey, to support search and rescue operations.

Aside from the Middle East, civil engineers deployed to Spain, England, Germany, France, Italy, Greece, Diego Garcia, and to other bases in the United States. They constructed tent cities at transit bases, supported Strategic Air Command tanker and bomber forces at multiple sites, and helped open contingency hospitals and aeromedical staging facilities across Europe.

Operation Desert Storm

Civil engineers at HQ USCENTAF said they could tell the air war had begun because the phones stopped ringing. At sites in the Middle East, CE was ready — forces were bedded down, equipment and materiel were dispersed, and personnel and structural protection were complete. Many went out to watch the aircraft launch on their first missions. Firefighters started working full-throttle. Integrated combat turns with hot pit refueling operations required continuous fire protection. As combat sorties increased, so did in-flight and ground emergencies, barrier engagements and explosive ordnance disposal response to malfunctioning ordnance.

In the busy days before the formal cease fire was signed, Prime BEEF moved into Kuwait to assist in restoring Kuwaiti facilities. Some went to Kuwait City International Airport to help restart the power plant.

In February, General Horner tasked RED HORSE to deny two air bases in southeastern Iraq to prevent future use by returning Iraqi forces, and the work had to be completed before the signing of a cease fire agreement. Working with EOD personnel, two teams completed the job within four days. At Tallil AB, RED HORSE used approximately 40 tons of explosives to make cuts in the runway and taxiway every 2,000 feet. At Jalibah AB, engineers denied a concrete runway and two asphalt taxiways with 72 craters up to 40 feet wide and 12 feet deep.

Operation Provide Comfort

Shortly after the war ended, Kurdish refugees began fleeing into Turkey to escape the Iraqi military. Because of their outstanding support to the U.S. Army in Turkey during Operation Proven Force, Air Force civil engineers were tasked to provide base support to the multiservice, multinational forces under the direction of Combined Task Force Provide Comfort. They established and maintained base camps at five locations in Turkey and Iraq from which the other services and allies could operate, including the major Humanitarian Service Support Base at Silopi that served as the center of activities for the region.

Engineers had just dismantled Tornado Town at Incirlik when they received orders to rebuild it to support the influx of allied personnel. The Prime BEEF team from Bitburg was recalled to Turkey after being home only a few weeks. They were joined by engineers from several other USAFE bases.

At Sirsenk airfield, engineers and EOD personnel cleared a dumping ground for unspent munitions from coalition aircraft and repaired the runway for C-130 aircraft to deliver supplies.

Redeployment

Redeployment of people and equipment and reconstitution of Harvest Falcon assets was a big job. CE was responsible for dismantling and repacking tents and related equipment.

As some troops redeployed, additional personnel continued to arrive in March and April. Reserve and Air National Guard Prime BEEF teams deployed to Al Kharj and King Fahd, respectively, to help close down the sites.

> CE...demonstrated once again that air base availability and performance are critical factors in a commander's ability to employ aerospace power.

In summary, civil engineers played a crucial role in Operations Desert Shield and Desert Storm by providing the basing and support that gave pilots and aircrews the best chance for success. They set the stage in record time and demonstrated once again that air base availability and performance are critical factors in a commander's ability to employ aerospace power. During Operation Provide Comfort, they tried their hand at humanitarian relief and clearly showed that engineers have a useful role to play in this type of civic action. Ten years later, the scope of their contributions and the excellence of their performance are still impressive.

Changing Times

Civil Engineering Since the Gulf War

by Lois Walker
HQ AFCESA Historian

Improved Equipment & Protective Gear

Silver Flag Exercise Site

Equipment for Training

10-222 Handbooks

Home Station Training

Bare Base Systems Working Group

R & D Initiatives

AFCAP

Joint Service Training

International Cooperation

What changes have occurred in civil engineering since the end of the Gulf War? Some are obvious. Manpower cuts over the past 10 years have resulted in a civil engineer active duty force that is much smaller than it was in 1991, down from 30,600 to about 17,500. Sweeping restructuring of the Air Force during the 1990s brought about a standardized civil engineer structure, with broader career fields and a multi-skilled, multi-talented force.

The focus of civil engineer contingency training has shifted dramatically from fighting in place and preparing for base recovery after attack, to an expeditionary posture, prepared for rapid emergency response to wartime or contingency situations, while employing a highly developed arsenal of engineering skills.

Engineers in the Gulf War found themselves performing beddown operations with equipment and mobility basing sets most had never seen before. Today's civil engineers can draw from a decade of beddown experience in locations such as Somalia, Bosnia, Hungary, Italy, Albania, Central America and the Middle East. Firefighters and EOD technicians have responded to the same contingencies, and now have an array of new tools, equipment and protective gear to meet current and future challenges.

Contingency training has also been incorporated into the earliest stages of Air Force training, in the form of Warrior Week during basic training, and at the Air Force Academy through the Global Engagement program.

We've seen major improvements in the types and quantities of equipment available for Prime BEEF and RED HORSE training. Readiness training moved from Field 4 at Eglin AFB to the new Silver Flag Exercise Site at Tyndall AFB in 1993, and Silver Flag is now on the initial receiving end for new war reserve materiel-type assets.

We've also made significant improvements to the *Bare Base Conceptual Planning Guide* and published a comprehensive set of pocket guides (10-222 series handbooks) for use in the field.

Computers have changed forever the way we gather and manage information, control work, train and test. Most Prime BEEF training is now conducted at home station via interactive CD-ROM technology.

Gulf War engineers suffered from a lack of communication and rapport with their logistics counterparts. Today, CE is involved with the logistics community through the Bare Base Systems Working Group and various readiness panels and boards, ensuring we are aware of the locations and conditions of our assets.

We've seen increased emphasis on weapons of mass destruction preparedness in the wake of bombings in Oklahoma City, at Khobar Towers, and at two U.S. Embassies in Africa. CE is better prepared today due to research and development initiatives that improved force protection construction standards, equipment and protective gear.

Through the Air Force Contract Augmentation Program (AFCAP), CE has developed strong partnerships with commercial firms to augment our efforts where needed. This contract capability ensures we make the most strategic use of military resources, especially in the sustainment phase of operations.

Interservice cooperation is more important than ever. Air Force CEs now train at joint service schools, and engineers from all services participate in Joint Chiefs of Staff and regional exercises, especially in Europe and the Pacific.

International cooperation remains essential to success, and progress has been made at all levels. From the annual International Engineer meetings that The Civil Engineer attends with his counterparts from other countries, to international participation in Readiness Challenge and individual national exercises and competitions, Air Force civil engineers are breaking ground and cementing relationships every year.

Humanitarian and disaster response operations have provided engineers with opportunities to practice many of the same skills they will need in wartime. Each emergency produces additional lessons learned to add to the corporate CE planning book. We've become the acknowledged experts at deploying to a contingency location, setting up to survive and operate, and caring for our customers so they can execute the mission.

With continuous improvements in training and equipment, Prime BEEF and RED HORSE engineers are trained and ready — an integral part of today's Expeditionary Aerospace Force. They have the mindset and the determination, the energy and the discipline, to get the job done. CAN DO, WILL DO, HAVE DONE!

CE Magazine Spring 2001

A Clearing in the Desert

EOD personnel are still finding, excavating remnants of the Gulf War

by TSgt Mitch Shimmel
332nd ECES

Although 10 years have passed since the Gulf War, there is still a very real and significant danger from unexploded ordnance, known as UXO, on Southwest Asia air bases.

Explosive ordnance disposal personnel assigned to the 332nd Expeditionary Civil Engineer Squadron are excavating the UXO that still endangers coalition forces. Their current task is a 2-foot subsurface clearance of 50 acres of land, which will enable the U.S. Army Corps of Engineers to construct a cargo aircraft parking ramp.

Special metal detectors are being used to reveal buried UXOs. In the first two days of searching, the EOD team located a cluster bomb unit (CBU-87) designed to contain 202 anti-personnel and anti-materiel bomblets — one of the most dangerous bombs in the U.S. arsenal.

When the CBU was dropped from the delivery aircraft, it was probably either too close to the ground for the dispenser to open or it was not properly prepared before takeoff. Whichever the case, the CBU was literally ripped open upon impact with the ground, which buried the partially consumed UXOs up to six feet.

Upon discovering the buried dispenser, the team was confronted with the very dangerous and challenging problem of how to excavate and dispose of the armed UXOs. To tackle the problem, the operation was split into two phases: first the excavation and then the disposal.

To excavate the UXOs while limiting the danger to personnel, only one option stood out — the team employed the newest, largest and most advanced robotic system available: the All-purpose Remote Transport System, or ARTS.

A1C Jamie Erickson operates the All-purpose Remote Transport System (ARTS) from a safe area using the Operator Control Unit. *(Photos by MSgt Robert C. Hodges)*

TSgt Robert Odell places a C-4, plastic-explosive charge near a hazardous BLU-97 submunition as part of the explosive clearance operation.

ARTS is a kevlar-tracked, remote-controlled 3.5-ton loader. Various tools can be attached to the platform, transforming it into a forklift, a backhoe, a UXO clearance vehicle for post-attack airfield recovery, or a vehicle used for deploying several specialized EOD tools supporting force protection responses.

With this ace in the hole, the EOD team prepared the ARTS platform for backhoe operations. Without the ARTS, the only option would have been to hand-excavate the site and endanger the lives of several U.S. Air Force EOD technicians.

The team set up the control station more than 500 feet away from the hazardous operations site. From this safe location, they were able to observe the radio-controlled ARTS as it excavated the CBU impact site.

After only four buckets of dirt were moved, the first

Continual platform improvements and new attachments for the ARTS, which was developed by the Air Force Research Laboratory in the mid-1990s, allow it to support surface and sub-surface unexploded ordnance removal in addition to its primary function of force protection operations and weapons of mass destruction response.

A sandbag bunker and concrete revetments provided additional protection from the bomblet's fragmentation.

bomblet was discovered. This part of the operation was very dangerous due to the sensitivity of the explosives and because liquid had seeped out and crystallized on the outside of the case. Due to the sensitive condition of the bomblets, the team decided to detonate them in-place.

Performing an explosive detonation at the excavation site required the entire civil engineering team to go into overdrive. Since the area was located only 100 feet from a paved taxiway and 200 feet from aircraft maintenance buildings, extensive protective works had to be put in place.

All known buried utilities were identified, and a special crane was leased to place the 10-foot barrier revetments. Coordination with all base agencies was conducted. With the base in increased security conditions, any unplanned detonation could have caused concern or panic on the installation.

Emergency response personnel assembled early on the morning of the disposal and received the sequence-of-operations briefing. Security forces members prevented access to the site by establishing a 700-foot cordon extending well into the flight line and coalition camp boundaries. The on-scene commanders, fire department, medical and EOD personnel assembled at the entry control point for the operation.

A sandbag coffin was placed around the items, providing additional protection from the bomblet's fragmentation. The explosives were then placed and detonated by the order of the commander. This brought an end to the submunitions and eliminated their potential to maim or kill.

TSgt Mitch Shimmel is an explosive ordnance disposal technician with the 332nd Expeditionary Civil Engineer Squadron at Ahmed Al Jaber Air Base, Southwest Asia.

Explosive ordnance disposal teams are putting the latest in robotics technology to good use at locations world-wide. A U.S. Air Forces in Europe team proved their ability to rapidly deploy with the ARTS and perform hazardous remote operations when the ceiling began to collapse in a munitions storage structure at Camp Darby, Italy.

Moving Munitions

EOD steps up to the task using new robotic platform

by Capt Todd Graves
31st CES

A portion of the collapsed ceiling in a munitions storage structure at Camp Darby, Italy. *(Photos courtesy 31st CES)*

The 31st Civil Engineer Squadron Explosive Ordnance Disposal Flight, Aviano Air Base, Italy, and the U.S. Air Forces in Europe Construction and Training Squadron (CTS), Ramstein AB, Germany, performed a little magic last summer with the help of some battle-proven technology.

The 31st Munitions Squadron (MUNS) at Camp Darby, Italy, had been experiencing structural problems with the ceilings in eight munitions storage structures (aboveground magazines or igloos) that contained high-explosive missiles, rocket warheads, projectiles and fuzes. The 22-year old facilities' structural problems had been progressing for years. Engineering studies were done in 1981 and again in 1995.

In the mid-1980s, a steel mesh was anchored into the ceiling and a coat of shockcrete (a type of concrete) sprayed into the mesh. But by last May, the weight of the coating had finally caused large pieces of the shockcrete, mesh and some of the original ceiling to separate in one of the igloos.

The 31st MUNS called in the U.S. Army Corps of Engineers to perform an engineering evaluation on all

eight igloos. The results raised serious concerns regarding the structural integrity of the facilities. As a result, the 31st MUNS disconnected power to the facilities and prohibited access to the eight igloos — including the stacked-to-the-ceiling munitions still stored there.

The 31st MUNS, working through the HQ USAFE staff, coordinated with the USAFE Civil Engineer to use EOD's latest robotic acquisition, the All-purpose Remote Transport System, known as ARTS, to move the munitions out of the igloos. SSgt Rusty Mills and SSgt Walter Moss from the 31st CES EOD Flight accomplished an initial site survey and determined the operation was feasible.

The only ARTS in command were at Ramstein's CTS site. TSgt Robert Hannan, a CTS EOD member, arranged to transport an ARTS to Aviano. As the command technical expert on the system, he accompanied the ARTS to provide additional training to the Aviano EOD team and to offer expertise and advice for the Camp Darby operation. The team spent one day training on the ARTS, then loaded it on a flatbed for the trip to Camp Darby.

Sergeant Hannan and the 31st CES EOD team (SSgt Benny Beach, Sergeant Mills and SrA Lenny Eckstein) traveled to Camp Darby on August 9. For two days, they worked with safety personnel and the 31st MUNS to coordinate the removal plan and perform an operational risk management review. They collectively developed a mission-oriented, prioritized munitions removal plan. With their task laid out for them, it was time to get to work.

The EOD team downloaded the ARTS and confirmed it was operational, then each team member practiced lifting and moving munitions pallets. This type of operation was different from the normal EOD mission and use of the ARTS, but the team had little difficulty mastering the necessary movements for "munitions storage and re-warehousing."

Once everyone was comfortable with the system, the team moved to the igloos. The goal of the first afternoon was to orient the team to the spaces in the igloos and to how the ARTS needed to be maneuvered to properly move items.

The team also used the Mk 3 Remote Ordnance Neutralization System (RONS) robot for additional monitoring capability. Because of the tight spaces in the igloos, the extra "eyes" of the RONS ensured big brother ARTS did not contact any munitions while trying to remove items. The RONS was also used to move small boxes from within the tight spaces that the ARTS could not maneuver to.

The team fine-tuned their procedures as the operation progressed. One member controlled the ARTS while another monitored with the RONS. Another teammate ensured each system had sufficient cable, while keeping track of each so that no cables were run over, possibly

The RONS robot was used for both monitoring the ARTS and picking up small packages.

tearing them. The last team member was assigned as safety observer to oversee and ensure the overall safety of the entire operation.

As the EOD robots brought the munitions out of the igloos, 31st MUNS personnel transported them to another storage area. The team methodically proceeded from facility to facility for 12 days, removing more than 100,000 items with a net explosive weight of over 53,000 pounds.

Although not designed nor purchased for this scenario, the ARTS proved its flexibility and worth by performing this bit of peacetime engineering magic.

Capt Todd Graves is the 31st CES EOD Flight commander, Aviano AB, Italy.

SrA Lenny Eckstein directs the ARTS' movements using joysticks and a monitor at the control station.

Let It Snow ...

Air Force program comes out of the Ice Ages

by TSgt Michael A. Ward
AFCESA Public Affairs

In the beach community of Panama City, Fla., sits the Air Force's snow and ice control manager. The sun may be shining brightly, but SMSgt Clyde Young is looking forward to snow. The reason? Like a kid with a new sled, he wants to try out his new toys.

For years, the Air Force's snow removal program was stuck in the Ice Age; straddled with a fleet of old, unreliable equipment that had either seen better days or simply didn't work. Young helped convince the Air Force to commit millions of dollars to new equipment and training.

"You've got to remove the snow and ice to launch and recover aircraft," Young said. "It's the same on the commercial side. What they're doing works for them, so it should work for us. That's what I had to convince people of."

Young, a heavy equipment operator who has worked snow removal at Grand Forks Air Force Base, N.D.; Osan Air Base, Korea and RAF Alconbury, United Kingdom, knew the first step was to replace the 50-year-old snow plows that are standard equipment at every snow base.

"We have a fleet of about 340 airfield snow removal plows in the inventory and more than half of them are the rollover WT-series trucks that are considered obsolete," he said. The plows, which initially had a life expectancy of about 13 years, were discontinued by the company in 1965.

"In the late 70s, when the plows were ready to be replaced, the Air Force opted for a rebuilding program instead," Young said. "We gave the trucks back to Oshkosh, who rebuilt them and sold them back to us. It was cost effective, however, we lost a lot of technology because even rebuilt, they are still 30-year-old trucks."

The new H-series trucks cost approximately $185,000 each, and will be phased in to replace the WT-series rollovers over the next 8-10 years.

Also on the chopping block is the Air Force's snow broom. It came into the inventory in the 1950s as a rotating broom towed behind a truck and eventually became a rotating broom mounted to the front of a dump truck. Either way, it wasn't very effective. "It was another initiative started to save money, but it's not industry standard either," Young said. "The front-mounted broom was a good idea, but had poor application." At Fairchild AFB, Wash., the broom fleet had only a 24 percent in-use rate in 1999. "Basically they were hangar queens waiting around for parts."

Upgrading the Fleet

The new snow removal equipment has many features that will improve operator performance and streamline maintenance.

The new Oshkosh H-Series high-speed reversible plow truck offers several operating advantages over the old Oshkosh P-Series rollover plow truck. The all-wheel steer feature reduces the turning radius and reduces maintenance on the tires and driveline. The cab-forward design with reverse slope windshield enhances operator visibility, while the rear engine design provides a quieter environment, eliminating the need for hearing protection and allowing the operator to easily monitor the radio. The counterweight is mounted on the center of the chassis, which displaces 56 percent of weight to the front axle and enhances maneuverability, traction and pushing capabilities.

Two types of plows will be offered, both with similar design and performance characteristics. Evaluations at Minot Air Force Base, N.D., through the Management Equipment Evaluation Program (MEEP), and at the Combat Readiness Training Center in Alpena, Mich., proved the high-speed reversible plows are superior to the rollover plow in terms of performance and maintenance.

The Oshkosh H-Series runway broom trucks offer several operating advantages as well. Unlike the aging dump truck-mounted snow broom, they are specifically designed for heavy-duty snow removal applications. The trucks are equipped with a 27,000-pound front axle versus the much lighter axle rating commonly found on mass-produced trucks. The rear engine design provides natural ballast for improved traction and offers a much quieter environment for the operator. Like the plow truck, the broom trucks feature cab-forward design with reverse slope windshields that significantly enhance operator visibility.

Three types of snow brooms will be offered. All similar in design and performance characteristics with various options available for each broom, including broom heads with cassette steel brush systems.

For more information contact SMSgt Clyde Young, HQ AFCESA, at DSN 523-6368, or e-mail clyde.young@tyndall.af.mil.

(Above)* The new H-series runway broom truck in use at Elmendorf AFB. *(Photo by Scott Anderson) (Right)* A video crew shoots footage at Fairchild AFB, for a new snow and ice control training video, slated for release this fall. *(Photo by SMSgt Clyde Young)

After about 10 years of "floundering around with it," the final straw came when a slightly redesigned version of the same broom truck proved to be equally inefficient and troublesome. "We got the first ones in 1999 and sent three to Elmendorf AFB, Alaska," Young said. "They stayed in the barn practically all winter long."

The new brooms are state-of-the-art, industry-quality equipment, but they aren't cheap, coming in at about $300,000 each, nearly twice as much as the old brooms. But, Young said, you get what you pay for. "By spending the money up front and buying what works, we'll save money down the line." The Air Force expects to purchase 10-15 snow brooms each year for the next five years.

The next change had nothing to do with inefficiency, but rather cost and environmental concerns. About four years ago the Air Force switched from urea as an airfield deicer to more environmentally friendly chemicals. While the new chemicals are less toxic and cause less damage to the environment, they cost about three times more.

"With urea, we could do blanket coverage of an airfield because it was fairly cheap," Young said. "But because of the cost of the newer chemicals — about $5,000 an application — we just can't afford to do that."

What was needed was a way to precisely determine when to apply deicer, where to apply it and how much to apply. The solution came from the Canadian Air Force and its computerized deicing system called SNIC — snow and ice control integrated system. The system uses computers and precision sprayers to control the rate of chemicals being applied.

The Air Force purchased 12 SNIC systems last year at $240,000 each and has contracted to buy up to 10 more.

The final piece of the puzzle is a new training video. "I was at Fort Leonard Wood, Mo., recently and the students there were watching the same video I watched as an airman basic. It's got a lot of antiquated equipment and a lot of the processes have changed," he said. Young and a video crew went to Fairchild and Elmendorf in January to shoot a new training video. The video will be in distribution before next snow season.

In the meantime, all Young can do is wait for the snow to fall. "We're hoping to get a lot of it this year so we can get a lot of good data."

Indeed.

Editor's note: Sergeant Young is assigned to the Air Force Civil Engineer Support Agency, Tyndall AFB, Fla. The preliminary reports he has received from bases using the new equipment have been very positive, showing greater efficiency and effectiveness, and monetary savings as well.

The spreader (*left*), grip tester *(bottom right)* and sprayer *(bottom left)* are the three components of SNIC, the newly adopted snow and ice control integrated system, which uses computers and precision sprayers to control the rate of chemicals being applied. *(Photos by Jerry Adamietz)*

Interservice Technical Training

Avoiding the proficiency credit pitfall

by TSgt James Dinsmoore
Community College of the Air Force

More than 2,000 Air Force enlisted personnel attend initial skills (three-level) training each year at Army, Navy, or Department of Defense schools not affiliated with the Community College of the Air Force (CCAF). While there are certainly advantages to attending interservice schools, this scenario has created some confusion and misinterpretation regarding the type of college credit students will receive.

There are several issues involved in receiving CCAF credit for attending non-Air Force technical schools, including whether the school is affiliated with CCAF and whether the individual has completed residency requirements and five-level training.

Why Interservice Training?

When DoD determined that consolidating two or more sister service schools into one could save vast amounts of money, a shuffling of schools took place that ultimately resulted in some Air Force schools falling under the umbrella of other services. For example, the Structural Apprentice course moved from Sheppard Air Force Base, Texas, to Gulfport, Miss. This presented a dilemma in that many students were not receiving credit for completed coursework because the course changed hands from the Air Force to the Navy. This realignment changed the way CCAF could award credit to Air Force students because the school was no longer owned by the Air Force.

Affiliated vs. Non-Affiliated Schools

The Air Force is the only service granted authority by public law to establish a community college. All schools "affiliated" with CCAF must be *owned* by the Air Force. Courses delivered by the Air Force have an Air Force course number. Most students attending technical school at Air Education and Training Command bases such as Sheppard or Keesler will attend an "ABR" course. ABR is an abbreviation for "Airman Basic Resident."

Courses with an ABA or ABN prefix are not owned by the Air Force. These are abbreviations for Airman Basic Army and Airman Basic Navy, respectively. Air Force students attending these courses at "non-affiliated" schools are issued Air Force certificates of training, but both public law and accreditation rules prevent CCAF from recognizing them as resident courses.

Meeting Residency Requirements

CCAF is accredited through the Southern Association of Colleges and Schools (SACS). This accreditation dictates several internal college policies. In order to maintain accreditation through SACS, all degree programs must meet minimum acceptable standards. One standard established by SACS is that of *residency*.

Residency, in regards to a degree program, is the amount of credit delivered by the degree awarding institution. Colleges and schools accredited by SACS must ensure that 25 percent of the credit is taken from and delivered by the degree granting institution.

Each CCAF degree program consists of 64 semester hours. This means that CCAF must deliver 16 semester hours of resident coursework. The fact that the initial skills-awarding courses do not meet the residency requirement doesn't mean the student will never be able to complete a CCAF degree, it simply means it may take a little longer than it does some of their Air Force counterparts.

The residency requirement can be fulfilled through several different sources. In fact, every Airman earns four semester hours of residency credit in physical education with the completion of basic training and participation in the Air Force physical fitness program. Airman Leadership School is currently worth an additional eight semester hours and five-level internship is currently valued at four semester hours. The cumulative total of these three items is 16 semester hours — the minimum residency requirement.

Applying the Proficiency Credit

When course ownership transferred from the Air Force to our sister services, CCAF obtained applicable course documents, evaluated, then assigned an appropriate semester hour value for initial skills courses. Whereas credit earned as a result of this process could not be considered CCAF degree applicable *resident* credit, CCAF determined the credit could be considered *proficiency* credit (P-credit).

P-credit is based on demonstrated knowledge and task competency that is validated by the award of the five-level skill level code. Once the five-level skill code is obtained, P-credit can then be applied toward completion of a CCAF degree.

Getting it on Record

Graduates of civil engineer interservice training courses are reported through the 366th Training

Squadron at Sheppard AFB to the Air Force Training Management System and ultimately to CCAF. This credit is normally reflected on students' CCAF records and can be applied toward fulfillment of the related specialty degree program.

Some students may have to submit a copy of their training certificate through their base education office to have the credits loaded to their records. This is either because they completed the course before the school began automatic reporting of graduates, or because their records were incorrectly updated.

If you have questions regarding your education records, please contact your base education office or the author, TSgt James Dinsmoore, civil engineer degree programs manager, CCAF, at DSN 493-6449, or e-mail james.dinsmoore@maxwell.af.mil.

Apprentice courses, training locations and their respective P-credit value: (Course credit varies depending on completion date.)

Pavement Maintenance/ Construction Equipment Operator Apprentice
Ft. Leonard Wood, Mo.
24 semester hours

Engineer Apprentice
Ft. Leonard Wood, Mo.
26 semester hours

Structural Apprentice
Gulfport, Miss.
31 semester hours

Explosive Ordnance Disposal/ Phase I & Phase II
Eglin AFB, Fla.
50 semester hours

The CCAF Mission

CCAF degree programs are aimed at enhancing the occupational competency of career non-commissioned officers, as opposed to first-term airmen who are busy learning their Air Force jobs, preparing for their journeyman skill level, and becoming productive members of the Air Force team.

CCAF's charter is to offer job-related Associate of Applied Science degree programs that enhance mission readiness, contribute to recruiting, and assist in retention of Air Force enlisted personnel. The program is structured so that the degree is earned on the second or subsequent enlistment — which supports the retention and readiness part of the mission statement. Currently, the average CCAF graduate is a staff sergeant with 13 years of service.

Airmen, soldiers, sailors and Marines learn structural design in the Engineering Apprentice course at Fort Leonard Wood, Mo., one of two interservice courses offered by Det. 7, 366 Training Squadron that provide proficiency credit. The other is Pavements & Equipment Apprentice. ***(Photos courtesy Det 7, 366 TRS)***

Keeping the Promise

New Strategies for providing quality technical training to utilities craftsmen

by MSgt Austin Carter
AFSPC Public Affairs

Airman 1st Class Adam Johnson of the 21st Civil Engineer Squadron at Peterson Air Force Base, Colo., leaned outward from the utility pole as far as his 6'3" frame and the boot spikes embedded into the wood would allow him. His ascent up the wooden pole at the Colorado Springs Utilities' (CSU) "Pole Farm" was to refresh his familiarity with heights and his agility in climbing laden with a fully equipped electrician's tool belt.

"C'mon, you can reach out farther than that," someone kidded him.

"Gimme a break. It's been a long time since I've done this," he said to the watching group 20 feet below. "Not since tech school."

Dave King, head training coordinator with CSU and a certified linesman, buckled his tool belt, strapped his linesman spikes to his calves and scampered up to Airman Johnson with the surety of a mountain goat traversing a steep Alpine slope. They worked in tandem at the top of a 40-foot training pole to remove and replace a cross beam which, according to their simulation, was severely storm damaged.

Both men disengaged the beam quickly, King working with alacrity born of years of experience and Airman Johnson showing a new sense of confidence with the unfamiliar surroundings.

Although there was little fanfare awaiting them when they descended the pole that day in January, both airman and veteran linesman had formed the first tenuous bond in a new era of training — one that could affect thousands of Air Force CE trainees in the future.

Air Force installations were once cities unto themselves, complete with their own water, waste water, electric and natural gas utility systems. CE maintained all of it. Then, in 1998, the Department of Defense issued a directive to the services to privatize utility systems at almost all military installations by September 2003. As Air Force engineers began developing plans for executing the DoD program directive, it became apparent that once under private ownership, utility systems would no longer be a resource that the Air Force could use for training.

According to CMSgt Jim Reps, Air Force Space Command functional manager for CE, the potential loss of training and hands-on expertise would represent a step backward in current efforts to improve the quality of technical training available to craftsmen. It could also bring new challenges to performing critical combat support roles.

"The CE community is visibly committed to providing training that's right in-step with cutting edge technology. The utility privatization effort provided the catalyst for us to focus our vision on new strategies for maintaining our high level of technical competency in the utility installation, maintenance and repair business," he said.

The next step was to replace the hands-on experience that CE workers now enjoy, but may soon disappear. Utility companies, with their experience, modern training equipment and facilities, and accessible locations, have been effectively training their own people for years. It made them the natural choice to help train the military's CE troops.

"Our search for cost-effective, high-quality, industry-standard training in a safe, controlled environment led us to a likely partner — those activities looking to assume

Dave King, Colorado Springs Utilities head training coordinator, trains A1C Adam Johnson, 21st CES, Peterson AFB, Colo., at the "pole farm." *(Photos by Rob Bussard)*

operational responsibility for our systems," Reps said.

Air Force leaders asked Space Command to spearhead the program to see if it would work. Soon after, the command began working with the local utility company in Colorado Springs in a test program to provide training.

"We had a great deal of confidence from the very start of this initiative that it would be a success. Our shared vision for what we needed to accomplish, and how best to do it, really made the difference," the chief observed.

It didn't take long for utility officials to share their optimism as well.

"It's the smart thing to do," said Trent Wright, the CSU training program coordinator and a former Air Force CE troop. "When I first heard about it, I was stoked. When I was training others in the Air Force I never got to see the impact my work had on the customer. Now, I will actually get to see good training for good people."

It only took two months after the first meeting between the local utility and U.S. Air Force to bring the first trainees to the utility training grounds: Airman Johnson, representing the upgrade phase of career development and SSgt Johnathon Johnson (no relation) representing the refresher phase.

"We're exploring ways to create a template that others can use. We're comparing our Career Field Education and Training Plans with their training documents and seeing where they're different. We're going to take our training guides, their guides, shuffle them up and see what falls out," the chief said.

The two CE troops' first lesson of the day was how to properly prepare a cable section for attaching a newly fabricated connection device used in overhead electric systems. The sergeant and the airman understood the principles and adroitly prepared the cable after watching a demonstration. This new method, they said, was slightly different than how they were taught in technical school.

Since all major electric cables are underground at Peterson, there is limited opportunity to work on terminal connections for overheads. Now, for the first time since arriving at Peterson, they are getting a chance to receive high-quality technical instruction at a facility dedicated to training electricians.

"One of the factors that makes this so easy for us to do is that electricians are an established technical trade," Reps said. "The Air Force already provides training that mirrors the private sector because we both reference sources like the National Electric Code, a standard from which we both build our training programs. Our two programs actually have a great deal in common."

This new training approach with industry, he continued, will provide CE troops expanded opportunities to work on the latest equipment with fully licensed master electricians. It will also hone their wartime skills. These include specialty skills they need to operate successfully in deployed environments.

"We're going into a partnership with private industry with eyes wide open," Reps said as he watched Airman Johnson scale the utility pole outside on his last exercise of the day. "We have a great opportunity here and the more we use it, the better we get."

Airman Johnson acknowledged that staying up-to-speed would be easier by training on the new equipment at the utility's training center.

"I think it's something that should have been done long ago," he said. "These guys do what we only talk about."

Besides, the chief added, there's an obligation imperative to consider as well.

"We're able to keep a promise to our troops; the one we made when they signed up. It's a promise that says we're totally committed to the professional development of our people."

Training Obstacles? Help is Available

Utilities privatization initiatives have forced the CE community to look hard at all available training opportunities. The Air Force Civil Engineer Support Agency worked with major command and unit training representatives to compile a list of these opportunities and guidelines for their use. The result —*A Commander's Procedural Guide: Obtaining Training in Support of EAF and Utilities Privatization* — is now available on the training division page of AFCESA's website (www.afcesa.af.mil).

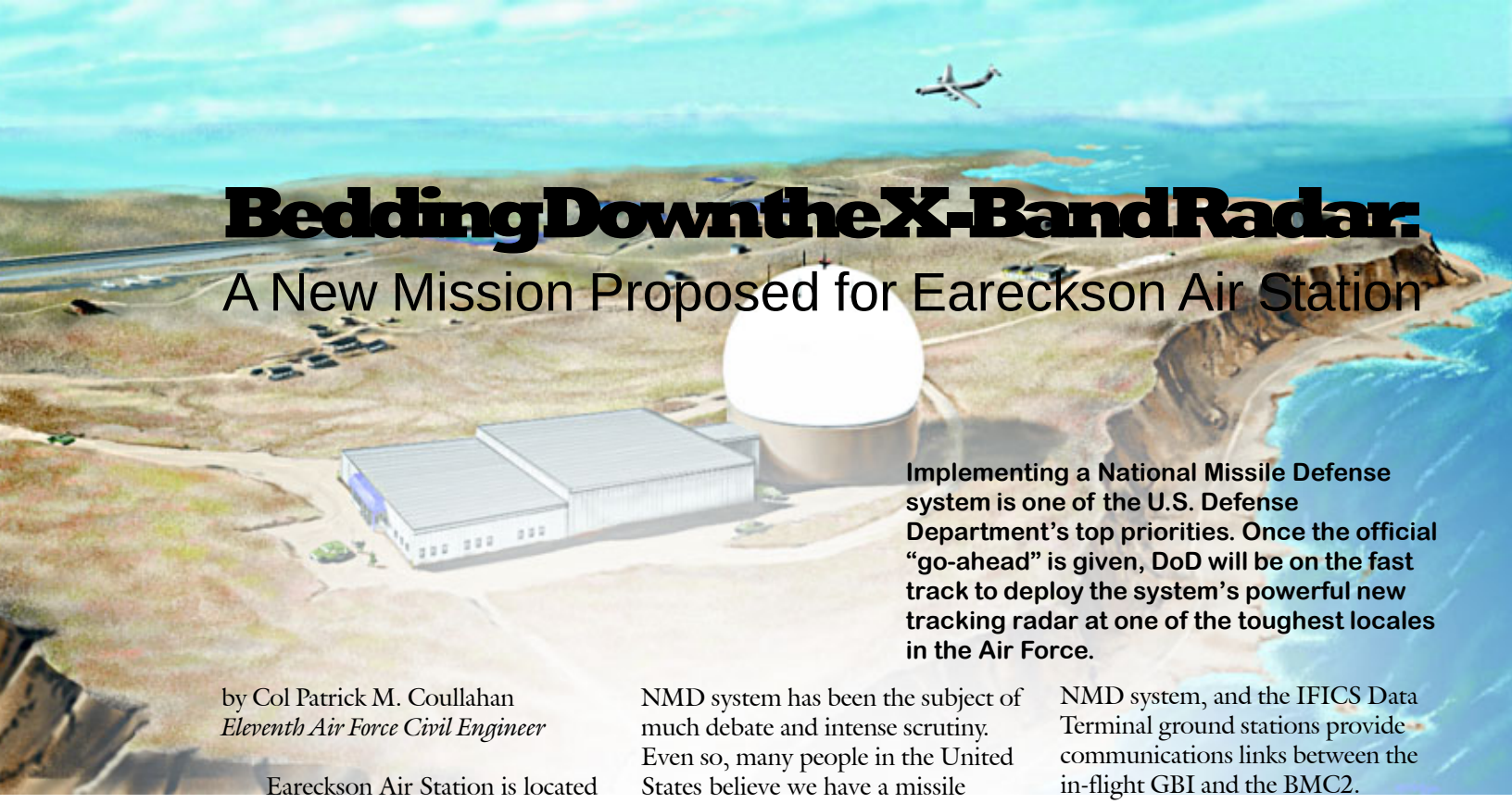
The guide provides CE commanders, supervisors and training managers with information necessary to meet training objectives lost or obscured due to utilities privatization initiatives. Additionally, the guide provides suggestions on obtaining expeditionary engineer training in support of worldwide Expeditionary Aerospace Force deployments, including resources provided by Air National Guard, Air Force Reserve Command and non-Defense Department educational sources.

Units with training obstacles other than utilities privatization or EAF challenges will find the guide useful, as well (for example, when a base has only underground electrical distribution systems and electrical personnel must still certify on overhead distribution core tasks).

The recently developed *Worldwide Contingency Training Locator* is also on the AFCESA website. The guide provides commanders, supervisors, unit education and training managers, and trainees a quick, concise reference to the locations and points of contact for multiple CE expeditionary engineering courses and equipment.

For more information, contact SMSgt Glenn Deese, HQ AFCESA, DSN 523-6392, or e-mail, Glenn.Deese@Tyndall.af.mil.

A1C Adam Johnson, SSgt Johnathan Johnson (no relation), and Colorado Springs Utilities training administrator Todd Thomas discuss the proper way to cut the jacket of an electrical cable.



Bedding Down the X-Band Radar:

A New Mission Proposed for Eareckson Air Station

Implementing a National Missile Defense system is one of the U.S. Defense Department's top priorities. Once the official "go-ahead" is given, DoD will be on the fast track to deploy the system's powerful new tracking radar at one of the toughest locales in the Air Force.

by Col Patrick M. Coullahan
Eleventh Air Force Civil Engineer

Eareckson Air Station is located on Shemya Island, a diminutive piece of real estate near the tip of the windswept Aleutian Islands in Alaska. At 1,500 air miles from Anchorage, the island is actually closer to Russia and Japan than to Alaska's largest city. It is Shemya's location that makes the island so important in the National Missile Defense (NMD) strategy.

The NMD system is intended to protect all 50 states from an incoming missile. While the primary threat to the United States no longer comes from a calculated strategic nuclear attack by the Soviet Union, our major concerns are accidental or unauthorized missile attacks by established powers and calculated strikes by "rogue nations" such as Iran, Iraq and North Korea.

The need for and timing of an NMD system has been the subject of much debate and intense scrutiny. Even so, many people in the United States believe we have a missile defense system already in place. Nothing could be further from the truth. In fact, putting such a system in place will require five years of construction and the efforts of several military and contract organizations.

The National Missile Defense construction and beddown at Eareckson has generated much high-level interest, leading to briefings to the Vice Chairman of the Joint Chiefs of Staff and Deputy Secretary of State. The Chairman, Senate Appropriations Committee; the Deputy Secretary of Defense; and the NASA Administrator on National Missile Defense have visited Eareckson and been briefed by the 611th Air Support Group. National news media interest in the island and the unique support role it may have in this program has increased as well.

A New Mission

Components of the NMD system include: ground based interceptors (GBI), battle management command and control (BMC2), an in-flight interceptor communications system (IFICS) data terminal, upgraded early warning radars (UEWR) and an X-band radar (XBR).

The GBI is the weapon of the system. It is designed to intercept incoming ballistic missile warheads outside the earth's atmosphere and destroy them on impact. The GBIs would remain in underground silos. Launches would occur only in defense of the United States from a ballistic missile attack — there would be no flight-testing of the missiles at the NMD deployment site. The GBI site would contain launch silos and related support facilities. Up to 100 GBI silos could be deployed. GBIs are not planned for basing at Shemya, but could be based at Fort Greeley, near Delta Junction, Alaska, or in northeastern North Dakota.

The BMC2 is the "brains" of the NMD system, and the IFICS Data Terminal ground stations provide communications links between the in-flight GBI and the BMC2.

The NMD system will require an upgrade to existing early warning radars at Clear AS, Alaska, Beale Air Force Base, Calif., and Cape Cod AS, Mass. These early warning radars, also referred to as "PAVE PAWS," are phased-array surveillance radars currently used to detect, track and provide early warning of sea-launched ballistic missiles. They also track satellites and space debris. Hardware and software modifications are planned for these existing radars, in conjunction with the NMD system, to allow the acquisition, tracking and classification of small objects near the horizon and provide data to other NMD elements using improved communications.

The NMD system's XBR will be a ground-based, multi-function radar capable of performing tracking, discrimination and kill assessments of incoming ballistic missile warheads. The XBR site at Eareckson will include a radar and associated support facilities.

Any deployment may require elements of the system to use existing fiber optic lines, power lines and other utilities, so modifications may be required. Some locations may require the acquisition of new rights-of-way and installation of new utility and fiber optic cable. Potential new

land fiber optic cable line locations include those along the Aleutian Islands to Eareckson. In addition, redundant fiber optic cable lines may be required in some locations for security purposes.

The 611th Air Support Group is deeply involved in preplanning activities for this new and important mission, which will require several million dollars in military construction (MILCON) facilities at Shemya Island alone.

Challenges Ahead

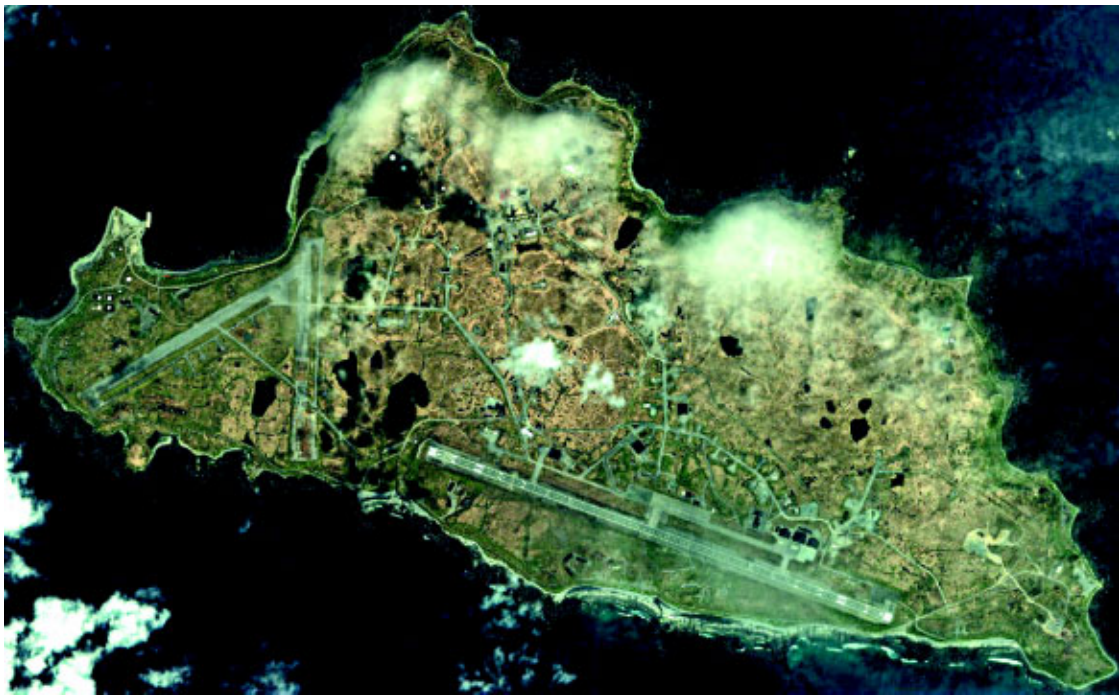
The island of Shemya may be a perfect location for the antiballistic missile radar, but it is a terrible place to try to build anything. But once the President says "go," the Pentagon plans to build the new 10 story-high radar there. The plan is to have the whole system up and running in less than five years, which, on this remote island, translates to a war against the elements and a logistical nightmare.

The weather on Shemya poses quite a challenge as it is very unpredictable — changing by the hour, and sometimes by the minute. Although average precipitation is only 2 to 4 inches per month, some form of precipitation occurs on a nearly daily basis.

The average low temperature during Shemya's coldest month (February) is a relatively mild 28 degrees Fahrenheit, but it is not unusual to witness hurricane force winds, enormous waves from the meeting of the Bering Sea and Pacific Ocean, and blizzards throughout the long winter months.

With construction on Shemya, we face monumental logistics issues such as barge sailings and unloading in rough seas. Equipment and supplies for the project, nearly all of the construction materials and heavy equipment, are not found on the island and will have to be hauled from Seattle — 3,000 miles away. This means hiring enormous barges to make the trip, then lining them up at Shemya's one dock to unload.

Erecting a 108-foot-high inflatable radar dome in an area with almost no respite from high winds poses a tremendous engineering challenge. In addition, Shemya has been rocked repeatedly by earthquakes over the years, requiring significant seismic design efforts to overcome the forces of Mother Nature and to prevent or keep damage to a minimum.



A 1965 earthquake in the nearby Rat Islands measuring 8.7 on the Richter scale caused cracks in Shemya's asphalt runway and created crevasses with as much as 16.5 meters of vertical displacement. Landslides occurred, water tanks twisted and underground water pipes broke. Many aftershocks were felt during the following weeks, and the quake generated a tsunami on Shemya reported to be about 10.7 meters high.

To counteract the effects of another earthquake of that magnitude there, the foundation planned for the radar alone will be over 25 feet thick and require more than 9,000 cubic yards of reinforced concrete to construct.

Reliable and cost effective primary power is another challenge in a place as remote as Shemya. To ensure continued mission success, a dedicated diesel generator power plant with high energy magnetic pulse (HEMP) shielding will be constructed to provide mission-critical power to the NMD system.

While construction of the NMD facilities on Shemya is very feasible, the effort will not be successful without a great degree of coordination and preparation. The many facilities now standing at Eareckson are a testament to DoD's ability to marshal the resources and talent needed to effectively build in the Aleutians.

If We Build It, They Will Come

The latest in living amenities for assigned NMD personnel will be included in the package. Even though Shemya is sometimes referred to as the "Black Pearl of the Pacific," one could say it is not exactly a Pacific island paradise. Attracting and keeping quality people with the

(Opposite)* A conceptual drawing of the proposed X-Band Radar at Eareckson Air Station. *(Above)* A satellite photo of Shemya, an 8-square-mile island in Alaska's Aleutian Island chain. *(Courtesy 611 ASG)

talent and savvy needed to run a complex that provides for our first measure of defense from rogue nations will certainly be impacted by the quality of life found at Shemya.

General Ronald R. Fogleman, former U.S. Air Force chief of staff, said at the Defense Forum Foundation in Washington D.C. on Jan. 24, 1997, that Shemya was "a God-forsaken place if you want to know the truth." However, despite that assessment and knowing the formidable challenges we face, we believe we can go a long way toward enhancing quality of life on Shemya with the advent of this new and important mission.

Col Coullahan is the Eleventh Air Force Civil Engineer and the 611th Air Support Group Deputy Commander, Eleventh Air Force, Elmendorf AFB, Alaska. As 11 AF Civil Engineer, Colonel Coullahan provides policy, oversight and advocacy for Air Force installations throughout the state of Alaska for civil engineering and develops long-range facility plans for the MILCON program to fulfill requirements for mission beddowns, base infrastructure, community support and family housing.

A Brief Military History of Shemya Island

On June 3, 1942, Japanese forces attacked U.S. Army and Navy Forces at Dutch Harbor, in Alaska's Aleutian Island chain. Four days later, the Japanese landed on Attu and Kiska islands, on the western end of the Aleutian chain. The Aleutian Islanders, known as Aleuts, living on Attu were taken to an internment camp on the island of Hokkaido, Japan. In response, the U.S. forced Aleut villagers on other islands to evacuate to southeast Alaska. Attu was recaptured by U.S. forces in May 1943.

By late May, U.S. forces began constructing an airfield on Shemya to support B-29 bombers for raids on northern Japan. The B-29s never came to Shemya, rather, B-24s flown by the 404th Squadron (Eleventh Air Force) operated from Shemya Air Station, raiding Paramushiro and the Kurile Islands between 1943 and 1945. The remains of World War II batteries and bunkers are still scattered across Shemya, as are foundation berms from other shelters.

Between 1946 and 1949, activities and personnel at Shemya AS were reduced. The Korean War brought renewed activity, as Shemya served as a refueling stop on the Great Circle Route between the Far East and North America. In 1954 the base was deactivated, and facilities were transferred to the Civil Aeronautics Authority and leased to Northwest Orient Airlines for use as a refueling stop.

Soviet rocket tests to Kamchatka during the late 1950s increased interest in Shemya as a location for monitoring missile tests from the far northeastern Soviet Union. Old facilities were rehabilitated and new ones constructed on the island, including a large detection radar (AN/FPS-17), which went into operation in 1960. In 1961, an AN/FPS-80 tracking radar was constructed nearby. These radars were closed in the 1970s when the Cobra Dane phased array radar was built to monitor missile tests. Meanwhile, Shemya was redesignated from an Air Force station to an Air Force base in 1968.

The 1980s also saw increased interest and many new projects on Shemya Island. In 1986, the Army constructed Queen's Match, a Star Wars missile defense research facility, on the northeast side of the island.

Most World War II facilities and equipment were dismantled and disposed of during the 1980s. In 1989, a massive military construction effort called "Fix Shemya" was used to build replacement facilities and repair existing facilities.

In 1993, Shemya AFB was renamed Eareckson AS in honor of Col William O. Eareckson. In 1942 and 1943, Colonel Eareckson personally led the difficult missions against the Japanese on Kiska and Attu, and helped plan the successful retaking of Attu. In 1995, Eareckson AS went through a draw down phase and converted to contractor support and maintenance for operation of the Cobra Dane radar.

The future holds still more activity for Shemya Island, as it is now the proposed site for construction and operation of an X-band radar for the National Missile Defense Program. More than 50 years later, the 8-square-mile island of Shemya continues its military service. *(Compiled from reports by the Eleventh Air Force History Office by Karlene Leeper, 611 CES/CEV.)*

Conserve Now or Pay Later

Energy Crunch Forces Greater Conservation Measures

by TSgt Michael A. Ward
AFCESA Public Affairs

Last November, an odd story appeared in an Associated Press news report. It said residents in parts of California were being asked to cut back on Christmas lighting due to energy shortages.

Most people outside of California probably didn't pay much attention to the story at the time, but it's now national news and California's energy problems are threatening to spread outside the state's borders as summer approaches.

The problems began innocently enough as an attempt to give California residents greater control over their utility bills, which were some of the highest in the country, according to the *San Francisco Chronicle*.

An appealing solution was deregulation of utilities, and in 1996 the California Legislature signed deregulation into law (deregulation began in 1998). Key components of the legislation included a 10 percent reduction in electrical rates for the approximately 27 million residential customers of the state's big three utilities and a customer rate freeze until March 31, 2002, (or until utility companies paid off all their past investments), according to attorney Lt Col Bill Wells, chief of the Air Force's utilities litigation team.

To encourage competition in power generation, the state strongly urged utility companies to sell off at least half of their power plants. Legislators believed that would create numerous new power plant owners, none of whom could single-handedly influence the price of electricity. They were wrong on both accounts. Selling off their power plants left utilities exposed and vulnerable. Not only were they unable to produce their own energy, they were also at the mercy of power wholesalers, including those who purchased their plants.

At first deregulation worked, but the dominoes for failure were set in motion in early 1999 when demand began to outstrip supply. No new major power plants had been built in the state for 10 years; yet electrical demand had surged dramatically upwards because of an increase in hi-tech industries and a growing population. Compounding the problem, California imports up to 25 percent of its electricity from outside the state. Neighboring states were also experiencing increased demand from their own customers, meaning less power available for export, Wells said.

Prices paid by utilities companies for electrical power suddenly began skyrocketing as wholesaler market rates jumped from as low as two cents per kilowatt-hour to more than a dollar. Since the price increases could not be passed on to customers because of the previously imposed price freeze, the utilities companies' debts rose at an incredible rate. In just a few months, PG&E and Southern California Edison, two of California's largest utilities, fell billions of dollars into the red. At one point, some suppliers stopped selling power to them because of their declining credit rating.

California and the federal government have recently stepped in to prevent the utilities from going under, enacting emergency measures requiring wholesalers to continue selling power to the utilities and allowing utilities to enter into long-term energy contracts which offer lower prices. In addition, the state allowed PG&E

California, as well as the nation, is also dealing with a shortage of natural gas. Extremely cold weather, particularly in the northeast, combined with decreased drilling has forced prices up almost 300 percent in the past three months. Drilling has resumed, but prices are expected to remain high for several years. Crude oil and gas prices are also expected to increase by summer, driven in part by the March announcement by the Organization of Petroleum Exporting Countries that it would reduce its crude oil production by one million barrels a day.

and Southern California Edison to raise rates by 15 percent for large commercial and industrial customers including military installations.

Because of the state's problems, bases have had to dust off long-dormant contingency plans and step-up existing energy conservation measures. DoD is looking at ways to reduce the electrical demand at California installations by 10 percent over last summer's peak baseline and by a 15 percent reduction by next summer. The Air Force Civil Engineer Support Agency, in conjunction with the major commands and affected bases, has developed several options to reduce demand, including greater conservation and producing power independently through Air Force-owned generators.

So far, the periodic rolling blackouts throughout California have not had a major effect on any installation. However, the state's energy problems are far from over and government officials believe other states will soon be affected as demand increases and supplies dwindle nationwide. With summer coming, officials are worried. Energy Secretary Spencer Abraham recently compared current energy problems to the energy crisis of the 1970s and warned that California's problems are not isolated or temporary.

"We've told other bases it's not too early to think about conservation; smart, long-term conservation," Wells said. "We've already seen rates increase in all western states and it's spreading eastward."

Edwards Shoulders Share of Energy Crunch

by MSgt Stefanie Doner
Air Force Flight Test Center Public Affairs

As the California energy crisis continues, Edwards Air Force Base, Calif., is stepping up efforts to conserve electricity and natural gas.

"While utility providers haven't requested that we cut energy consumption by a specific amount yet, it's important that we all do our part as good neighbors to conserve energy resources and keep the base's utility costs low," said Capt Amy Hoffer, 95th Civil Engineer Squadron.

Those efforts are paying off. In the first month of the new year, main base operations cut natural gas consumption by 12 percent over that used in the same period last year, a $75,000 energy savings.

Additionally, Air Force Research Laboratory's Propulsion Directorate cut their natural gas use by 11 percent, saving the base another $10,000.

Continuing to conserve electricity remains a hot topic on Edwards and throughout the state. The current conservation initiatives on base include shutting down lights on streets and in parking lots. To ensure safety, however, intersections remain lit. The base lowered temperatures on thermostats to 68 degrees this winter, and increased the summertime temperature to 78 degrees. Hot water heaters to restrooms and the compressed natural gas station have been shut down to conserve energy.

Base employees and housing residents have been encouraged to shut off all lights not in use, to ensure their desktop computers are completely shut down at the end of the day, and to take other measures that will save energy without significantly impacting quality of life.

Edwards officials are formulating contingency plans should the situation worsen. These include partially or totally shutting down natural gas service to the main base, which could last from a few hours to a few days.

Although flight line operations haven't been seriously affected to date, the base is examining the possibility of shortening shift lengths and workweeks to help cut energy use should the problem escalate.

To help people become more involved in the conservation effort, Edwards established an energy hotline and an e-mail account for people to report areas where energy may be wasted or to offer suggestions for improving conservation efforts.

SSgt William McDaniel, 95th CES, maintains ceiling lighting units as part of an energy conservation push at Edwards AFB, Calif. ***(Photo by TSgt Chris Ball)***

RED HORSE Paves at Prince Sultan

A team from the 819th RED HORSE Squadron, Malmstrom Air Force Base, Mont., deployed to Southwest Asia in October to pave a munitions supply road at Prince Sultan Air Base.

The dirt road serving the western munitions storage area there was in need of constant repair. Ruts and soft spots were making travel difficult. Rather than allow the road to deteriorate and become unstable and unusable for munitions operations, RED HORSE was called in to pave it.

The initial design for the project was complete in September, but once construction crews arrived on site it had to be modified due to equipment shortages. Repairing the road surface and preparing it for asphalt pavement required about 20,000 cubic meters of fill material. The crew straightened curves in the middle of the road, removed hills and filled low spots to level the overall road surface. Drainage was provided for on and around the road, and all sand piles on both sides of the road were removed or leveled.

The crew placed about 9,500 cubic meters of basecourse and used about 3,200 tons of asphalt to pave 7,000 feet (24 foot wide, or 34 foot including the shoulder) of dirt road.

The 17-member team finished the road in December, after honing their wartime readiness skills and providing a quality product to the customer. *(Capt Matt Benivegna, 819th RHS)*

The western munitions storage area road at Prince Sultan Air Base before *(top, left)*, during *(left)*, and after *(above)* 819th RHS construction crews arrived on-site. *(Photos courtesy 819 RHS)*

Design-Build Project Underway at Charleston

Construction began in January on a new $18.1 million, 55,000 square foot, corrosion control facility at Charleston Air Force Base, S.C. Construction is scheduled for completion in early 2002.

The facility is being realized under a new contracting concept known as design-build. In the past, one firm designed a project and another firm built it. With the new design-build concept, one firm is now responsible for all phases of construction, including design. The project was awarded to the Austin Company, a firm that recently designed and built a facility at Tinker AFB, Okla.

The base also completed renovations on 20 military family homes in the Hunley Park housing area. During renovations, the homes were completely gutted, floor plans were rearranged and energy-efficient appliances were installed.

"Hunley Park renovations have been a labor of love for a number of years; a great success story and an award-winning project," said Lt Col Jon Roop, 437th Civil Engineer Squadron commander. "It's a great thing for the families that live here." *(SrA Donald Church, 437th AW Public Affairs)*

2000 Air Force Civil Engineer Awards

Lt Gen Michael E. Zettler, Deputy Chief of Staff for Installations and Logistics, Headquarters U.S. Air Force, has announced the recipients of the 2000 Air Force Civil Engineer Awards. The awards were presented during National Engineers Week, on Feb. 21, at the 39th annual Civil Engineer Awards Luncheon at Bolling Air Force Base, Washington, D.C.

Following are the winners and runners-up.

Unit Awards

The Air Force Outstanding Civil Engineer Unit Award

Large Unit Category

52 CES, Spangdahlem AB, Germany (USAFE)
Runner-up — 96 CEG, Eglin AFB, Fla. (AFMC)

Small Unit Category

92 CES, Fairchild AFB, Wash. (AMC)
Runner-up — 8 CES, Kunsan AB, Korea (PACAF)

Outstanding Unit Award winners also receive The Society of American Military Engineers Curtin Award for 2000. The SAME award is named for Maj Gen Robert H. Curtin, Director of Air Force Civil Engineering from 1963 to 1968.

Brigadier General Michael A. McAuliffe Award (Housing Flight)

355 CES, Davis-Monthan AFB, Ariz. (ACC)
Runner-up — 66 CES, Hanscom AFB, Mass. (AFMC)

Major General Robert C. Thompson Award (Resources Flight)

31 CES, Aviano AB, Italy (USAFE)
Runner-up — 16 CES, Hurlburt Field, Fla. (AFSOC)

Brigadier General Archie S. Mayes Award (Engineering Flight)

8 CES, Kunsan AB, Korea (PACAF)
Runner-up — 48 CES, RAF Lakenheath, U.K. (USAFE)

Major General Clifton D. Wright Award (Operations Flight)

35 CES, Misawa AB, Japan (PACAF)
Runner-up — 9 CES, Beale AFB, Calif. (ACC)

Chief Master Sergeant Ralph E. Sanborn Award (Fire Protection Flight)

35 CES, Misawa AB, Japan (PACAF)
Runner-up — 436 CES, Dover AFB, Del. (AMC)

Senior Master Sergeant Gerald J. Stryzak Award (Explosive Ordnance Disposal Flight)

52 CES, Spangdahlem AB, Germany (USAFE)
Runner-up — 2 CES, Barksdale AFB, La. (ACC)

Minton "Best Author" Award to be Re-established

The Air Force Civil Engineer Awards Program will increase in scope next year by re-instituting an award to acknowledge contributors to the *Air Force Civil Engineer* magazine.

The Major General Augustus M. Minton Award, named for the former Director of Civil Engineering, Headquarters U.S. Air Force, from 1957 to 1963, will recognize the most outstanding article published in the magazine. All Air Force military personnel, civilian members and contractors who contributed articles during the award period are eligible and will automatically be considered for the award. Articles published in the Fall 2000 through Summer 2001 issues will be considered during judging for the 2001 award.

The purpose of the award is to encourage greater participation in the magazine and foster increased excellence in coverage of CE programs and activities. Entries will be judged on how well they communicate professional ideas and information and provide timely coverage of civil engineering activities and events.

General Minton founded the magazine in 1960, transforming it from an in-house newsletter for the Air Force Civil Engineering Center at the Air Force Institute of Technology to an Air Force-wide professional military engineering periodical. The general established a "Best Author Award" which existed from 1960 until 1989 and was co-sponsored by the Director of Civil Engineering and the Aerospace Education Foundation of the Air Force Association. The award was re-named for General Minton in 1973.

Colonel Frederick J. Riemer Award (Readiness Flight)

27 CES, Cannon AFB, N.M. (ACC)
Runner-up — 90 CES, F.E. Warren AFB, Wyo. (AFSPC)

Air Force Outstanding Civil Engineer Environmental Flight Award

354 CES, Eielson AFB, Alaska (PACAF)
Runner-up — 366 CES, Mountain Home AFB, Idaho (ACC)

Individual Awards

The Society of American Military Engineers Newman Medal

Col David W. DeFoliart, HQ USAF, Washington, D.C. (USAF)
Runner-up — Col Louis K. Lancaster, HQ PACAF, Hickam AFB, Hawaii (PACAF)

The Society of American Military Engineers Goddard Medal

Active Duty
MSgt Anthony J. Michels, 56 CES, Luke AFB, Ariz. (AETC)
Runner-up — SMSgt Bobby L. Burns II, 554 RHS, Osan AB, Korea (PACAF)

Air Force Reserve
MSgt Jeffrey T. Jarvis, 916 CES, Seymour Johnson AFB, N.C. (AFRC)

Air National Guard
MSgt Douglas J. Gilbert, 202 RHS, Camp Blanding, Fla. (ANG)

Major General Joseph A. Ahearn Enlisted Leadership Award

CMSgt Victor P. Jones, 65 CES, Lajes Field, Azores (ACC)
Runner-up — CMSgt Thomas Martone, 66 CES, Hanscom AFB, Mass. (AFMC)

Major General William D. Gilbert Award (Staff Action Officer)

Officer
Lt Col Charles G. Emmette, HQ USAF, Washington, D.C. (USAF)
Runner-up — Lt Col James E. Welter, HQ AMC, Scott AFB, Ill. (AMC)

Enlisted
SMSgt Calvin E. Dickens, HQ AETC, Randolph AFB, Texas (AETC)
Runner-up—SMSgt Paul L. Hicks, HQ AFCESA, Tyndall AFB, Fla. (AFCESA)

A student finds out just how heavy an explosive ordnance disposal protective suit really is at the annual Engineers Week Family Night, Feb.21, in Washington D.C. SSgt Joe Rodriquez, 325th EOD Flight, Tyndall AFB, Fla. (left), and SSgt Harry Bounds, 52nd EOD Flight, Ramstein AB, Germany, help the unidentified youth don the suit. Approximately 2,000 people attended the event, held in conjunction with National Engineer's Week.

Lt Col Kim Traver, commander, 52nd CES, accepts the Outstanding Civil Engineer Unit Award from Maj Gen Earnest O. Robbins II *(left)*. The Outstanding Unit Award winners also receive the SAME Curtin Award, named for Maj Gen (ret.) Robert H. Curtin *(right)*.

Brig Gen L. Dean Fox, director of Civil Engineering, Air Mobility Command, and Lt Col Juan Ibanez, commander, 92nd CES, *(fourth and fifth from right, respectively)* with 92nd CES members after receiving the Outstanding Civil Engineer Unit Award and SAME Curtin Award at the Civil Engineer Awards Luncheon Feb 21.

Civilian
John N. Williams, GS-13, HQ ACC, Langley AFB, Va. (ACC)
Runner-up — Dana S. Bouley, GS-14, HQ USAF, Washington, D.C. (USAF)

Harry P. Rietman Award (Senior Civilian Manager)
Udo Stuermer, C-9, 52 CES, Spangdahlem AB, Germany (USAFE)
Runner-up — George H. Franklin Jr., GS-15, HQ USAF, Washington, D.C. (USAF)

Major General Eugene A. Lupia Award (Military Manager)
Capt Frank K. Miyagawa, 96 CEG, Eglin AFB, Fla. (AFMC)
Runner-up — Capt AnnMarie Halterman-O'Malley, 31 CES, Aviano AB, Italy (USAFE)

Major General Eugene A. Lupia Award (Military Technician)
TSgt Thomas Deville Jr., 90 CES, F.E. Warren AFB, Wyo. (AFSPC)
Runner-up — SSgt Vandiver K. Hood, 86 CES, Ramstein AB, Germany (USAFE)

Outstanding Civil Engineer Senior Military Manager
Lt Col Thomas J. Schluckebier, 66 CES, Hanscom AFB, Mass. (AFMC)
Runner-up — Maj Gregory J. Rosenmerkel, 92 CES, Fairchild AFB, Wash. (AMC)

Outstanding Civil Engineer Military Superintendent
MSgt Michael A. Schreck, 15 CES, Hickam AFB, Hawaii (PACAF)
Runner-up — SMSgt Glenn L. Deese, HQ AFCESA, Tyndall AFB, Fla. (AFCESA)

UNIT SPOTLIGHT

"Can Do, Will Do, Have Done!"

Unit Name: 52nd Civil Engineer Squadron **Parent Unit:** 52nd Fighter Wing (U.S. Air Forces in Europe) **Location:** Spangdahlem Air Base, Germany **Commander:** Lt Col Kim C. Traver **Assigned Personnel:** 403 military, 315 German National, 15 U.S. civilians **Mission:** Plan, build, maintain and protect premier military installations in peace and war for the 52nd Fighter Wing and its people.

Unique Requirements: Spangdahlem AB occupies approximately 1,374 acres on the site of a former World War II German Panzer supply and staging site. The 52nd FW is responsible for locations geographically distributed throughout the Eifel region of Germany and geographically separated units in Belgium, the Netherlands, Denmark, Bavaria and Northern Germany.

The 52nd CES maintains more than 10.4 million square feet of real property and 4,116 facilities on 2,478 acres at Spangdahlem and the geographically separated locations, and services more than 12,000 customers including military, civilians and dependents. The squadron deployed more than 250 people last year in support of operations in Saudi Arabia, Kuwait, Turkey, Slovakia, Ecuador and Peru.

Recent Accomplishments: One of the 52nd CES' most challenging tasks is completing more than $200 million worth of construction in support of the Rhein Main Transition Program. This program, scheduled for completion in 2005, transfers operational capability from Rhein Main AB to Spangdahlem and Ramstein AB. It is one of the largest construction undertakings in USAFE, but one that the squadron's innovative people are more than capable of handling.

Another squadron success story is the Spangdahlem Work Order Allocation Program, or SWOAP. This program provides group and squadron commanders the ability to set priorities and focus civil engineer capabilities on their most critical requirements. It gives control of resources to those closest to the wing's mission, but allows CE to determine the best means of execution.

In 2000, the 52nd CES took home four Air Force-level awards: The Society of American Military Engineers Curtin Award (Outstanding Civil Engineer Unit, large unit category), the SMSgt Gerald J. Stryzak Award (Outstanding Explosive Ordnance Disposal Flight), the Harry P. Rietman Award (Outstanding Senior Civilian Manager), and the Lance P. Sijan Air Force Leadership Award, junior officer level. In addition, the squadron won 10 USAFE-level CE awards, doubling the previous year's list of accomplishments. These awards and the winning team spirit of the 52nd CES embody the unit's motto "Can Do, Will Do, Have Done!"

Outstanding Civil Engineer Civilian Manager

John E. Fluharty, WS-12, 81 CES, Keesler AFB, Miss. (AETC)
Runner-up — Donald R. Ballard, GS-8, 347 CES, Moody AFB, Ga. (ACC)

Outstanding Civil Engineer Civilian Supervisor

Mireno Polo Del Vecchio, U-4, 31 CES, Aviano AB, Italy (USAFE)
Runner-up — Janice M. Patterson, GS-7, 43 CES, Pope AFB, N.C. (AMC)

Outstanding Civil Engineer Civilian Technician

Kenji Taneichi, MLC 2-6, 35 CES, Misawa AB, Japan (PACAF)
Runner-up — Michael G. Meyer, WG-10, 56 CES, Luke AFB, Ariz. (AETC)

Outstanding Civil Engineer Individual Mobilization Augmentee Officer Manager

Maj Leslie L. Welter, HQ AMC, Scott AFB, Ill. (AMC)
Runner-up — Lt Col Bernard J. Grivetti, 20 CES, Shaw AFB, S.C. (ACC)

Outstanding Civil Engineer Individual Mobilization Augmentee Enlisted Manager

CMSgt Terry N. Thacker, 65 CES, Lajes Field, Azores (ACC)
Runner-up — MSgt Leonard B. Howard, HQ AFCESA, Tyndall AFB, Fla. (AFCESA)

UNIT SPOTLIGHT

"Lead the Charge!"

Unit Name: 92nd Civil Engineer Squadron **Parent Unit:** 92nd Air Refueling Wing (Air Mobility Command) **Location:** Fairchild Air Force Base, Wash. **Commander:** Lt Col Juan Ibanez, Jr. **Assigned Personnel:** 200 military and 177 civilians **Mission:** Provide combat engineer forces in support of global operations, while delivering the full spectrum of real property and emergency services to the 92nd ARW, an Aerospace Expeditionary Force Lead Mobility Wing, and other base units.

Unique Requirements: Fairchild AFB is home to four air refueling squadrons and 19 associate units, including the Air Force Survival School (Air Education and Training Command), the 2nd Support Squadron (Air Combat Command), and the 141st Air Refueling Wing (Washington Air National Guard).

Recent Accomplishments: The 92nd CES has a strong record of sustained excellence, winning the Air Force Outstanding Civil Engineer Unit Award, small base category, in 2000 and in 1998, and placing second in 1997.

Teamwork and taking care of its people provided the foundation for success. A deployed spouses' sponsor program and a "Hearts Apart" facility allow family members to keep in touch. Thanks in part to a new training center, the 92nd is the only CE unit to have won the Fifteenth Air Force Training Award, and has won it four times. The unit's hard chargers also won the 2000 Fairchild Commander's Trophy for sports excellence. The squadron supports the community as well, winning the coveted "Golden Hammer" award from Habitat for Humanity.

Facility excellence shines throughout the base. The recent winner of two Air Force Design Awards, an aggressive $51 million construction program in 2000 produced a new education center and library, squadron operations facility, 14 new housing units, $1.6 million in neighborhood upgrades, and more. The first performance-based maintenance contract in AMC keeps housing top-notch.

The unit won the 2001 White House "Closing the Circle" award for waste prevention. Last year, the 92nd won the AF General Thomas D. White Award for Environmental Quality and was the only federal agency, and only repeat winner, to earn the Washington State Governor's Award for pollution prevention. Winter operations can be difficult in the Great Northwest, but winning AMC's Balchen-Post Award for snow removal four of the past five years shows the unit knows how to meet the challenge.

As combat engineers, the unit proved its mettle when it dominated at AMC's first Expeditionary Operational Readiness Inspection. The entire engineer team was named "exceptional performers" by the AMC Inspector General and contributed to the wing's overall "Excellent" rating.

The unit's unofficial motto is "Lead the Charge!" — and that's what it does every day.

CE Captain Selected for Sijan Award

Capt Michael A. Geer, a civil engineer at Spangdahlem Air Base, Germany, is a recipient of the 2000 Lance P. Sijan U.S. Air Force Leadership Award. The Sijan award recognizes people assigned to wing-level organizations and below who have demonstrated outstanding leadership abilities. It is presented annually to four Air Force members representing the senior and junior officer and enlisted corps.

Capt Michael Geer (right) and SSgt Sandra Butler, 52nd CES, review sight plans for new water storage tanks at Spangdahlem AB, Germany. Geer is a 2000 Lance P. Sijan Air Force Leadership Award recipient. *(Photo by SrA Esperanza Berrios)*

"I was surprised when I was nominated by the squadron, let alone winning at Air Force," said the 52nd Civil Engineer Squadron winner in the junior officer category. "There are such tremendous people doing great things at this base and in this command." The captain's supervisor, though, wasn't surprised by his selection.

"We've had a huge construction and design program during the past couple of years. Without Capt Mike Geer's superb management skills, we would not be able to support additional initiatives such as the Rhein Main Transition Program and the Military Family Housing Renovation Project," said Udo Stuermer, engineering flight commander. "The RMT program alone is a 333 million Deutsche Mark program consisting of 23 projects which have to be designed by September 2001 and constructed by June 2005. The MFH initiative is calling for an improvement of all unrenovated housing units by 2010. Here we're talking about another investment in the amount of $160 million."

Geer is currently the design and construction chief for the 52nd CES. "That means that just about anything built or repaired by someone other than an Air Force unit is done in my section," said Geer. "Our big efforts right now are the design for the Rhein Main mission transfer, a water project and family housing renovations."

There are 29 people working in Geer's section — ranging from engineers and project inspectors to surveyors and drafts people. The group is about evenly split between military and civilians.

Geer graduated with a bachelor's degree in civil engineering from Massachusetts Institute of Technology and was commissioned through its Reserve Officer Training Corps program. Through an Air Force Educational Delay program, he went straight to graduate school for a master's degree in civil engineering at Penn State, and then back to MIT for doctoral studies. He entered active duty before completing his doctorate, but still hopes to finish it. Geer is married and has a 1 year-old daughter. "My family supports me much more than I deserve," he said. *(From an* Eifel Times *report by 1st Lt Angela Johnson, 52nd Fighter Wing Public Affairs)*

NSPE Air Force Engineers of the Year

The National Society of Professional Engineers has named the winners of its "Air Force Engineer of the Year" awards.

Lt Col Jared A. Astin, Headquarters Air Force Center for Environmental Excellence, Brooks Air Force Base, Texas, and Larry W. Smith, 45th Civil Engineer Squadron, Cape Canaveral Air Force Station, Fla., were among 34 engineers from 14 federal agencies to be recognized by the society.

Colonel Astin, chief of AFCEE's Environmental Restoration Division, managed the Air Force's largest and most politically sensitive environmental cleanup program at the Massachusetts Military Reservation. AFCEE officials said that Astin has maintained a close working relationship with key community members and federal and state regulators to strike a balance between purely technical solutions and the desires of local communities around the installation.

Larry Smith is an environmental engineer in the 45th CES' CCAFS detachment. Among his recent achievements, he managed a $5 million safe drinking water project at a CCAFS satellite launch facility from research through construction. He also saved the Air Force $2 million on a landfill closure project and developed a vegetative barrier system research pilot project to reduce groundwater contamination by planting trees.

Awards were presented during an Engineers Week luncheon Feb. 22 at Ft. Myer, Va. *(HQ AFCEE Public Affairs contributed to this report.)*

2000 Air Force General Thomas D. White Environmental Awards

Outstanding Air Force efforts to preserve and enhance the environment were recognized recently with the presentation of the fiscal year 2000 General Thomas D. White Environmental Awards. The ceremony was held May 1 at the Pentagon.

This year marked a change in the environmental awards program. Instead of presenting awards in 20 categories annually, as had been done in the past, awards were presented in 10 categories this year with the second 10 to be presented next year, making the awards biannual. This change was driven by the same change made in the Department of Defense Environmental Security Awards. All White Award winners (with two exceptions where no corresponding category exists) go forward as Air Force nominees to the DoD award competition.

Environmental Quality Award (Industrial)
Vandenberg AFB, Calif. (AFSPC)

Environmental Quality Award (Overseas)
Aviano AB, Italy (USAFE)

Environmental Quality Award (Reserve Component)
Minneapolis-St. Paul Air Reserve Station, Minn. (AFRC)

Natural Resources Conservation Award (Large Base)
Eglin AFB, Fla. (AFMC)
Honorable Mention — Patrick AFB/ Cape Canaveral AS, Fla. (AFSPC)

Cultural Resources Management Award (Installation)
611th Air Support Group, Elmendorf AFB, Alaska (PACAF)
Honorable Mention — 56th Range Management Office, Luke AFB, Ariz. (AETC)

Cultural Resources Management Award for Individual/Team Excellence
Vandenberg AFB, Calif. (AFSPC)

Restoration Award (Installation)
Offutt AFB, Neb. (ACC)

Pollution Prevention Award (Non-Industrial)
Offutt AFB, Neb. (ACC)

Pollution Prevention Award (Individual/Team)
R. Michael Willard, Patrick AFB/ Cape Canaveral AS, Fla. (AFSPC)

National Environmental Policy Act Award
Patrick AFB/Cape Canaveral AS, Fla. (AFSPC)

Brigadier General Henry J. Stehling *1918 - 2001*

Brigadier General (ret.) Henry J. "Fritz" Stehling, USAF, died Feb. 2 at a Fort Worth, Texas, hospital. He was 82 years old.

General Stehling served Air Force civil engineering from its beginnings in the late 1940s through the height of the Vietnam War. His military career began in 1942, when he graduated from Officer Candidate School (U.S. Army Corps of Engineers). He served as an instructor and a company commander during World War II.

In 1948 he transferred to the newly formed Air Force, holding positions at Tyndall and Pinecastle Air Force Bases, Fla., and Randolph AFB, Texas. From March 1954 until June 1955, General Stehling served as chairman of a field group for the U.S. Air Force ad hoc board that developed integrated management controls within civil engineering functional areas that were later implemented Air Force-wide.

His next assignments were overseas tours as deputy district engineer for the Joint Construction Agency at Nancy and Paris, France, and staff engineer for Seventeenth Air Force at Wheelus Air Base, Tripoli, Libya.

He returned to the United States in 1958, attending Air War College at Maxwell AFB, Ala. His next assignments were in the Directorate of Civil Engineering, Headquarters U.S. Air Force, as deputy chief, Programs Division then chief, Base Maintenance Division.

General Stehling is perhaps best known for the outstanding support he provided to field engineers during the Vietnam War when he served as Director of Civil Engineering, Headquarters Pacific Air Forces, from 1964 to 1967. His last two assignments were as the Deputy Chief of Staff for Civil Engineering at Air Training Command and as the Director, Real Property Maintenance Directorate, Office of the Assistant Secretary of Defense (Installations and Logistics), Washington D.C.

The general retired from active duty in August 1970. He was the recipient of The Society of American Military Engineers Newman Medal in 1961.

Lieutenant Colonel-Selects

Congratulations to the following Air Force civil engineer officers on being selected for promotion to lieutenant colonel.

Lonny P. Baker
Gerard A. Castelli
Joseph E. Castro
Gary D. Chesley
Darren R. Daniels
Martin E. Granum
Lance C. Hafeli
Jeffrey A. Jackson
Richard S. Jarvis
Carl V. Jerrett
Harold W. Keck Jr.
Walter J. King
Galen P. Kirchmeier
Jerry G. Kline
Jose A. Mata
Kevin L. Mattoch
Robert A. McCaughan
Michael P. Rits
Craig A. Rutland
Raymond A. Sable
Stephen E. Shea
Terrace B. Thompson
Phillip C. Triplett Jr.
Terry Watkins
Jerry K. Weldon II
Robert T. Wynn
David L. Yang

Senior Master Sergeant-Selects

Congratulations to the following Air Force civil engineer NCOs on being selected for promotion to senior master sergeant.

William A. Amburgey
Kelvin M. Andress
Gary A. Ashmore
Joseph F. Balcer
Steven M. Berry
Robert M. Buchanan
Mark A. Campbell
Alfred K. Casale
David C. Cherry
Leroy E. Coonce
Scott E. Cornell
Anthony Cotton
Charles A. Dewar
Alvin L. Douglass
Rocky D. Dunlap
James R. Ferrell
Keith D. Finney
Dale D. Fowler
Federico Garabito
Willie Graves Jr.
Robert E. Greene
Garth H. Hallenbeck
Floyd L. Harvey
Jeffrey L. Hawkins
Michael A. Helms
Dwight Henderson
Eric D. Hester
Robert D. Hobart
Robert C. Hodges
William F. Huff
Robert J. Hulbig
John J. Kahler
Michael J. Kane
Dwayne E. Kelch
Steven D. Kelly
James A. Kindler
Claude F. Lieth
Douglas E. Lindsey
Scott R. Lohman
Maurice A. Lopez
Wade F. Mackenstadt
Joseph E. Marshall
Jake B. Mathews
Adrian P. May
John W. McDuffie Jr.
Anthony J. Michels
Brian L. Mosier
Brian L. Munley
Bradley Nicholson
Robert A. Orrill
Michael P. Parsons
Rian S. Peaceman
Timothy J. Pitman
Allen B. Posey
John J. Powers
Lloyd M. Puckett
Kevin N. Remedies
Bonnie Richardson
Jeffrey L. Schley
Michael A. Schreck
Karl R. Schulz
Mary B. Smith
Kevin M. Sorenson
Gary Stuckenschmidt
John D. Thomas
Michael A. Trevino
Terence Trier
Douglas A. Wheeler
David R. Williams
William C. Young Jr.

Civil Engineer Chief Master Sergeants

Aitken, Ronald L.	690 SPTS (ACC)	Kelly AFB, Texas
Allen, Raymond F. III	HQ PACAF	Hickam AFB, Hawaii
Alt, Jeffrey	HQ AFCESA	Tyndall AFB, Fla.
Ambelang, David A.	5 CES (ACC)	Minot AFB, N.D.
Armstrong, William D.	821 SG (AFSPC)	Buckley AFB, Colo.
Aton, Mark A.	22 CES (AMC)	McConnell AFB, Kan.
Auld, Richard G.	56 CES (AETC)	Luke AFB, Ariz.
Barker, Brian R.	HQ USAFE	Ramstein AB, Germany
Barnes, Dann E.	820 RHS (ACC)	Nellis AFB, Nev.
Bender, John S.	HQ ACC	Langley AFB, Va.
Berube, Marc P.	3 CES (PACAF)	Elmendorf AFB, Alaska
Binggeli, Kerry C.	HQ AMC	Scott AFB, Ill.
Blackburn, Billy	737 TRG (AETC)	Lackland AFB, Texas
Bock, Jerry L.	786 CES (USAFE)	Ramstein AB, Germany
Bragg, Karen S.	78 CES (AFMC)	Robins AFB, Ga.
Brautigam, Donald R.	62 CES (AMC)	McChord AFB, Wash.
Brock, Danny M.	721 CES (AFSPC)	Cheyenne Mtn. AFS, Colo.
Burney, Garrick	81 CES (AETC)	Keesler AFB, Miss.
Bushnell, Gary D.	USAFE CTS	Ramstein AB, Germany
Cain, Eddie N.	820 RHS (ACC)	Nellis AFB, Nev.
Caldwell, James R.	51 CES (PACAF)	Osan AB, ROK
Carson, Wayne T.	97 CES (AETC)	Altus AFB, Okla.
Carter, George	366 TRS, Det. 7 (AETC)	Ft. Leonard Wood, Mo.
Cassidy, Patrick A.	30 CES (AFSPC)	Vandenberg AFB, Calif.
Challis, John V.	HQ PACAF	Hickam AFB, Hawaii
Chambers, George J. III	52 CES (USAFE)	Spangdahlem AB, Germany
Clark, Douglas P.	99 CES (ACC)	Nellis AFB, Nev.
Clark, Stephen B.	ETSS (AFELM)	Jiyanklis AFD, Egypt
Colburn, Timothy D.	HQ ACC	Langley AFB, Va.
Coleman, Rodney E.	HQ AFSPC	Peterson AFB, Colo.
Cote, Donald L.	66 CES (AFMC)	Hanscom AFB, Mass.
Couch, Marvin L.	HQ AFCESA	Tyndall AFB, Fla.
Davis, Vincent E.	820 RHS (ACC)	Nellis AFB, Nev.
Deese, Glenn L.	HQ AFCESA	Tyndall AFB, Fla.
Delay, Terence L.	86 CES (USAFE)	Ramstein AB, Germany
Dersarkisian, Paul C.	823 RHS (ACC)	Hurlburt Field, Fla.
Dickens, Calvin E. Jr.	HQ AETC	Randolph AFB, Texas
Dixon, Larry D.	823 RHS (ACC)	Hurlburt Field, Fla.
Dixon, Mary L.	90 CES (AFSPC)	F.E. Warren AFB, Wyo.
Dodson, Daniel S.	HQ AMC	Scott AFB, Ill.
Doorbal, Norma J.	HQ USAFE	Ramstein AB, Germany
Doris, Michael F. Jr.	HQ USAF	Pentagon, D.C.
Earley, Gregory C.	HQ PACAF	Hickam AFB, Hawaii
Estep, Donald A.	305 SVCS (AMC)	McGuire AFB, N.J.
Ethington, William M. II	305 CES (AMC)	McGuire AFB, N.J.
Ezell, Michael J.	HQ AETC	Randolph AFB, Texas
Fairey, Robert C.	5 CES (ACC)	Minot AFB, N.D.
Fedarko, Deborah J.	HQ ACC	Langley AFB, Va.
Fennigkoh, Allen	20 CES (ACC)	Shaw AFB, S.C..
Fisher, James H.	49 CES (ACC)	Holloman AFB, N.M.
Foltz, Arthur B. Jr.	HQ ACC	Langley AFB, Va.
Fones, Craig A.	HQ PACAF	Hickam AFB, Hawaii
Force, David G.	16 CES (AFSOC)	Hurlburt Field, Fla.
Ford, Linnard F.	HQ ACC	Langley AFB, Va.
Ford, Terry G.	HQ USAFE	Ramstein AB, Germany
Fox, Roger J.	366 CES (ACC)	Mountain Home AFB, Idaho

Francis, Antonio J.	796 CES (AFMC)	Eglin AFB, Fla.
Fuller, Steven	37 CES (AETC)	Lackland AFB, Texas
Gentz, Gary A.	374 CES (PACAF)	Yokota AB, Japan
Gillin, Kerry B.	HQ PACAF	Hickam AFB, Hawaii
Glover, Carl B. Jr.	HQ AFCESA	Tyndall AFB, Fla.
Godsey, Edward O.	82 CES (AETC)	Sheppard AFB, Texas
Grau, Brian G.	366 TRS (AETC)	Sheppard AFB, Texas
Gray, Richard W.	3 CES (PACAF)	Elmendorf AFB, Alaska
Gray, Thomas L.	100 CES (USAFE)	RAF Mildenhall, U.K.
Groover, Leander W.	347 CES (ACC)	Moody AFB, Ga.
Guidry, James M.	92 CES (AMC)	Fairchild AFB, Wash.
Gustafson, John M.	796 CES (AFMC)	Eglin AFB, Fla.
Gutknecht, Richard G.	HQ AETC	Randolph AFB, Texas
Hackenberger, Dennis J.	4 CES (ACC)	Seymour Johnson AFB, N.C.
Hannan, James J.	366 TRS, Det. 3 (AETC)	Eglin AFB, Fla.
Harrison, Winfred B. Jr.	374 CES (PACAF)	Yokota AB, Japan
Hartman, Jackie K.	9 CES (ACC)	Beale AFB, Calif.
Heath, Dennis R.	4 CES (ACC)	Seymour Johnson AFB, N.C.
Henry, Trevor A.	HQ ACC	Langley AFB, Va.
Hill, Jeffrey L.	341 CES (AFSPC)	Malmstrom AFB, Mont.
Hinegardner, William L.	HQ AFCESA	Tyndall AFB, Fla.
Hinners, Keith P.	HQ AMC	Scott AFB, Ill.
Hodges, Carl P.	HQ AMC	Scott AFB, Ill.
Hosburgh, Wayne R.	45 CES (AFSPC)	Patrick AFB, Fla.
Howard, Larry J.	42 CES (AETC)	Maxwell AFB, Ala.
Huckabee, Robert L.	43 CES (AMC)	Pope AFB, N.C.
Hughes, Jimmey M. Jr.	778 CES (AFMC)	Robins AFB, Ga.
Ishmael, Tommy L. D.	HQ AMC	Scott AFB, Ill.
Jackson, Larry L.	100 CES (USAFE)	RAF Mildenhall, U.K.
Jackson, Timothy A.	823 RHS (ACC)	Hurlburt Field, Fla.
Jefferson, Lenward Jr.	20 CES (ACC)	Shaw AFB, S.C.
Johnson, Richard N.	30 CES (AFSPC)	Vandenberg AFB, Calif.
Jones, Douglass P.	422 ABS (USAFE)	RAF Croughton, U.K.
Jones, Randy F.	823 RHS, Det. 1 (ACC)	Tyndall AFB, Fla.
Jones, Ricky A.	78 CEG (AFMC)	Robins AFB, Ga.
Jones, Victor P.	65 CES (ACC)	Lajes Field, Azores
Karls, Jeffrey A.	52 CES (USAFE)	Spangdahlem AB, Germany
Keller, Bruce E.	28 CES (ACC)	Ellsworth AFB, S.D.
Kembel, Steven W.	819 RHS (ACC)	Malmstrom AFB, Mont.
Kibbe, Myrl F.	HQ AFCESA	Tyndall AFB, Fla.
Landolt, Robert H.	795 CES (AFMC)	Edwards AFB, Calif.
Lichtenberger, Russ L.	52 CES (USAFE)	Spangdahlem AB, Germany
Livingston, Gary E.	75 CEG (AFMC)	Hill AFB, Utah
Lopes, Daryle L.	96 CES (AFMC)	Eglin AFB, Fla.
Lozano, Gilbert	51 CES (PACAF)	Osan AB, ROK
Lubbers, Edmond H.	355 CES (ACC)	Davis-Monthan AFB, Ariz.
Martone, Thomas	66 CES (AFMC)	Hanscom AFB, Mass.
Maynor, Roger D.	1 CES (ACC)	Langley AFB, Va.
McClain, Charles O.	18 CES (PACAF)	Kadena AB, Japan
Mifsud, Michael D.	951 RSPTS (AFRC)	Tyndall AFB, Fla.
Miller, Alfred H. Jr.	11 CES (11 Wing)	Bolling AFB, D.C.
Monell, Dane R.	60 CES (AMC)	Travis AFB, Calif.
Montoya, Ricardo V.	21 CES (AFSPC)	Peterson AFB, Colo.
Moore, Bobby G.	HQ AFRC	Robins AFB, Ga.
Morris, Thomas M.	HQ AFCESA	Tyndall AFB, Fla.
Mortenson, Kevin L.	5 CES (ACC)	Minot AFB, N.D.
Naas, Thomas G.	436 CES (AMC)	Dover AFB, Del.
Niswonger, Robert W.	509 CES (ACC)	Whiteman AFB, Mo.

Noel, Gilbert	HQ AFSPC	Cheyenne Mtn. AS, Colo.
O'Donnell, Michael J.	92 CES (AMC)	Fairchild AFB, Wash.
Olson, Steven T.	31 CES (USAFE)	Aviano AB, Italy
Orozco, Carlos	HQ USAFE	Ramstein AB, Germany
Painter, Dwayne E.	48 CES (USAFE)	RAF Lakenheath, U.K.
Papineau, Douglas L.	36 CES (PACAF)	Andersen AFB, Guam
Parks, Jesse F.	1 CES (ACC)	Langley AFB, Va.
Person, Antony J.	Det 1 PACAF CES	Kadena AB, Japan
Pitrat, Paul L.	16 CES (AFSOC)	Hurlburt Field, Fla.
Podolske, James E. Jr.	HQ AFCESA	Tyndall AFB, Fla.
Poliansky, Walter	89 SPTG (AMC)	Andrews AFB, Md.
Pope, Susan A.	819 RHS (ACC)	Malmstrom AFB, Mont.
Powell, Gary W.	554 RHS (PACAF)	Osan AB, ROK
Pratt, Rhea A.	43 CES (AMC)	Pope AFB, N.C.
Quattrone, Wayne E. II	314 CES (AETC)	Little Rock AFB, Ark.
Rabonza, Anthony M.	18 CES (PACAF)	Kadena AB, Japan
Ramos, Ercilia H.	12 CES (AETC)	Randolph AFB, Texas
Rausch, Gene A.	HQ PACAF	Hickam AFB, Hawaii
Rawls, Brian K.	37 CES (AETC)	Lackland AFB, Texas
Ray, Steve M.	796 CES (AFMC)	Eglin AFB, Fla.
Reps, Jameson D.	HQ AFSPC	Peterson AFB, Colo.
Rivera, Joseph W.	HQ AFCESA	Tyndall AFB, Fla.
Roberson, Alvis G. Jr.	HQ PACAF	Hickam AFB, Hawaii
Romig, Gerald D.	375 CES (AMC)	Scott AFB, Ill.
Runnels, Larned E. III	HQ ACC	Langley AFB, Va.
Saulnier, Dennis E.	OSD	Pentagon, D.C.
Savo, Antonio	820 RHS (ACC)	Nellis AFB, Nev.
Scheide, Thomas J. Jr.	2 CES (ACC)	Barksdale AFB, La.
Seeley, John D.	48 CES (USAFE)	RAF Lakenheath, U.K.
Seeloff, Jeffrey A.	HQ AFMC	Wright-Patterson AFB, Ohio
Semenuk, Michael S.	99 CES (ACC)	Nellis AFB, Nev.
Sharman, Carla F.	437 CES (AMC)	Charleston AFB, S.C.
Sharpe, Brad A.	35 CES (PACAF)	Misawa AB, Japan
Silas, Earl D.	6 SPTG (AMC)	MacDill AFB, Fla.
Smith, James K.	42 CES (AETC)	Maxwell AFB, Ala.
Smith, Peter K.	9 AF (ACC)	Al Kharj AB, Saudi Arabia
Steele, Timothy P.	50 CES (AFSPC)	Schriever AFB, Colo.
Stewart, Darryl R.	HQ ACC	Langley AFB, Va.
Stone, Randy A.	60 CES (AMC)	Travis AFB, Calif.
Stoye, Kirk E.	48 CES (USAFE)	RAF Lakenheath, U.K.
Tabor, Martin B.	823 RHS (ACC)	Hurlburt Field, Fla.
Taylor, Steven A.	778 CES (AFMC)	Robins AFB, Ga.
Tedford, Patrick A.	49 MMS (ACC)	Holloman AFB, N.M.
Thompson, Cleveland A.	50 CES (AFSPC)	Schriever AFB, Colo.
Tiggs, Charles E.	88 CES (AFMC)	Wright-Patterson AFB, Ohio
Track, Frederick J. Jr.	HQ ACC	Langley AFB, Va.
VanSteenburg, George W.	8 CES (PACAF)	Kunsan AB, ROK
VanWinkle, Mark	HQ AETC	Randolph AFB, Texas
Vogel, Daniel L.	31 CES (USAFE)	Aviano AB, Italy
Walker, Curtis N.	42 CES (AETC)	Maxwell AFB, Ala.
Walker, Eppie L.	18 CES (PACAF)	Kadena AB, Japan
Whitehorn, Jimmie E.	HQ ACC	Langley AFB, Va.
Wiitala, Troy C.	375 CES (AMC)	Scott AFB, Ill.
Wilkins, Clyde E.	HQ AFRC	Robins AFB, Ga.
Winward, James A.	786 CES (USAFE)	Ramstein AB, Germany
Wright, Paul E.	HQ ANG	Andrews AFB, Md.
Wuilliez, Raymond M.	HQ ACC	Langley AFB, Va.
Wynn, Susan K.	HQ AFRC	Robins AFB, Ga.

Civil Engineers in the Gulf War